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ABSTRACT

This report describes student technicians who dropped out of postsecondary education courses before qualifying for the New Zealand Certificate of Engineering (NZCE). The exploratory study describes some of the characteristics and progress of the students who dropped out of NZCE studies and investigates the reasons for high dropout among students. The first part of the report focuses on student characteristics and progress as portrayed by records of 5,200 students who dropped out over an 8-year period in the 1970s. Student records contain potential influences on dropouts and student characteristics. This information includes entry qualifications, exemptions, length of study, mode of study, course options, and student registration. The second part of the report presents the more detailed information obtained directly from 267 former students who were followed up in 1981 and 1982. A questionnaire was used to obtain information on the work and study experiences of the students. Case studies of four dropouts are presented. The report concludes with a discussion of the issues that should be considered in planning a more comprehensive study of dropouts. The report includes 26 tables, 12 figures, an appendix listing jobs held while studying, the study questionnaire, and 26 references. (NLA)

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DROPOUT in TECHNICIAN ENGINEERING COURSES

An exploratory study of dropout from New Zealand Certificate in Engineering Courses

Fay Panckhurst, John Panckhurst
and Graham Wagner

New Zealand Council for Educational Research

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Fay Panckhurst, John Panckhurst
and Graham Wagner

New Zealand Council for Educational Research
Wellington, 1986

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Introduction

Training for industry today involves new demands. Industry needs people with a greater range of technical understanding and skills who can adapt readily to increasingly sophisticated technology. Consequently more interest has centred on the educational provisions of training programmes and how these can best foster the flexible, problem solving approach required. Where economic uncertainty adds to the pressure of new technology, as in New Zealand, the demand intensifies for well-qualified and skilled staff for industry, commerce and the Public Service. Economic growth may depend largely on the supply of such people in greater number. The failure of substantial numbers of industrial or business recruits to complete their educational studies is therefore likely to be viewed with particular concern.

This is not to suggest that dropout is a new problem in vocational education. On the contrary, the so-called wastage resulting from dropout was one of the main factors which led to the re-structuring of technical education and the introduction of new technician courses in England and Wales in the early 1960s (Moor, Dean and Andrews, 1983). Likewise a 'disturbing' level of attrition from technician courses in New Zealand was identified by administrators in 1963 (Technicians Certification Authority, 1963). But at that time the concern expressed in this country was related to educational standards and students' personal development. The more recent expressions of concern have linked dropout with national development needs and the shortage of key technicians in the workforce, particularly technician engineers (see, for example, Engineering Industry Training Board, 1985).

The report that follows is about student technicians who drop out of educational courses before qualifying for an award called the New Zealand Certificate in Engineering. Engineering students are the largest segment in the area of technician education. They are located mainly in urban areas throughout New Zealand, in companies of different size and type as well as in the national, regional and local body government sectors. What the students have in common is a demanding pattern of part-time study, usually combined with work over several years, in order to gain a vocational qualification. Not surprisingly many of them drop out, often without achieving any success. Are these students unable to cope with the double burden of work and study? Are they dissatisfied with the courses? Or have they changed their minds about the kind of work they want to do? The reasons for dropout remain obscure, largely because information has seldom been sought from the former students themselves. Related studies of nurse trainees (Taylor and others, 1981), trades apprentices (Marriott and Elley, 1984) and adult education students (Boshier, 1969; Horton, 1976; Tremaine and Cavanagh, 1979) suggest that tertiary students encounter many problems in their studies and that the real reasons for dropout are not always obvious or simple.

The exploratory study reported here attempts to uncover some of the reasons for the high dropout among technician engineering students, while at the same time pointing the way to further investigation. In the first part of the report (Chapters 3, 4 and 5) we focus on student characteristics and progress as portrayed by the records of students who dropped out over an eight-year period in the 1970s. The second part (Chapters 6 to 10) presents the information obtained directly from a small number of these former students who were followed up in 1981 and 1982. The report concludes with a discussion of the issues which are important to consider in planning a more comprehensive study of dropout (Chapter 11).

We begin with an account of how the study came about (Chapter 1) and the method used to gather the two complementary sets of information (Chapter 2).

1 The NZCE Dropout Study

The New Zealand Certificate in Engineering (NZCE) Dropout Study had two objectives:

1. to describe the characteristics and progress of students who dropped out of NZCE studies before obtaining the final certificate;
2. to investigate the reasons for dropout among NZCE students.

For the purposes of the study students who had not completed the NZCE course were classified as dropouts when they had shown no evidence of study for the three preceding years. The evidence used to determine dropout was the information on registration and examination success held by the examining authority.

The study relied on the co-operation of two national bodies: the New Zealand Council for Educational Research, the research organization which carried out the investigation, and the Authority for Advanced Vocational Awards (AAVA), the accrediting and examining body which provided the essential record data for the project. This chapter outlines the role of AAVA in the education of technicians, discusses the impetus for the research, and describes how the research objectives were developed.

The Authority for Advanced Vocational Awards (AAVA)

AAVA has been described by its present Director as:

> the national statutory body which has responsibility for the Technicians Certificate and the NZ Certificate, the latter being the principal qualification in New Zealand for technicians or sub-professionals in building, commerce, science, engineering and draughting.
> (Imrie, 1984, p.2)

The Authority's stated functions are:

1. To set standards, approve curricula, and prescribe courses and syllabuses for advanced vocational awards; and to conduct examinations, and to appoint examiners, moderators, supervisors, and assessors for the purposes of those examiantions:
2. To prescribe conditions for entry to courses for advanced vocational awards and to grant exemptions where it considers it appropriate:
3. When so requested and after satisfying itself of the standard and other relevant matters, to give approval and recognition to courses provided by technical institutes or community colleges or other institutions or organisations:
4. To approve teaching institutions as being suitable to conduct prescribed courses, and to accredit approved teaching institutions to conduct examinations to a national standard:
5. To grant or issue, either independently or in conjunction with any other examining body, diplomas or certificates to any person in recognition of having successfully completed a course prescribed or approved under this Act; and in like manner to grant or issue endorsements of such diplomas or certificates.

(AAVA Handbook, 1985)

As a necessary part of these formal functions of prescribing, examining, approving, accrediting and awarding, AAVA registers students for its courses and records their progress. AAVA's student records, together with the records established by the body which AAVA superseded, the Technicians Certification Authority, form a national resource of basic information for studies of trainee technicians.

Students for the New Zealand Certificate courses register with AAVA through their selected teaching institutions before the end of March each year. The facts recorded at registration include the usual identifying information (name, address, birthdate, sex) as well as information on year registered, entry qualifications, occupation and employer, certificate and option, and teaching institution. There is also provision for recording course credits from either passes or exemptions and for noting certificates awarded.

In 1983, 15,862 students registered for AAVA full-year and block courses leading to the New Zealand Certificate, 6,569 of them for the engineering option (Department of Education, 1984). The courses are taught locally in technical institutes and community colleges or, at a distance through the New Zealand Technical Correspondence Institute. A special feature of the

AAVA courses[1] is that they require students to have suitable prior or concurrent work experience during the latter stages of the five-stage certificate courses. Students must complete three years of work experience in order to be awarded the NZCE. This requirement is made because students are expected to gain a better understanding of the prescribed knowledge and skills from being in a complementary work setting. Hence part-time study is the norm for students at stages 3 to 5, and is generally undertaken on a day release basis or through evening classes. But other types of courses are also taken, such as block courses, correspondence study and accelerated study.

Not all NZCE students complete the first two stages of the course while working concurrently in industry. Some start their studies on a full-time basis without any work experience. In fact the present study emerged from a consideration of the needs of this group of full-time students, as the following section explains.

Background to the research

The study resulted from a wider policy concern that had been expressed by administrators in the Continuing Education Unit of the Department of Education : What is the best type of full-time pre-employment vocational course to provide in technical institutes? In 1981, within the Department of Education, interest in this issue centred on the only forms of bursary-assisted full-time courses on offer for technician education. These courses, usually referred to as two-in-one or three-in-one courses, allow students to complete the first two or three years of their technician studies by attending as full-time students at a technical institute for one academic year. Full-time study enables students to reduce significantly the minimum five years their certificate studies normally take to complete on a part-time basis. But even with this encouragement many students seemed to drop out in the later stages of their courses. Analysis of AAVA figures on the number of registrations compared with the number of certificates issues three years later suggested that over 60 percent dropped out between stage 3 and stage 5 of the New Zealand Certificate in Engineering courses. This high dropout rate, together with the suspected further loss of students before they reached stage 3, led to speculation on what caused students to withdraw from these courses. Could it be that, instead of staying on in the 7th form at school, they were enrolling for three-in-one courses because these were the only remotely relevant full-time courses available at technical institutes? It was this possibility which, in August 1981, prompted the Department of Education to approach the New Zealand Council for Educational Research, expressing interest in:

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[1] Readers interested in the more detailed structure of NZCE courses should refer to the annual AAVA handbook.

> investigating the disparity between the numbers of students entering part-time courses, and full-time 2 in 1 and 3 in 1 NZCE courses, and the number who subsequently register at stage 3 and then gain AAVA certificates. (Buck, 1981)

At that time the investigation was seen as a preliminary exercise of sifting out information which might lead to further research.

The research objectives

The New Zealand Council for Educational Research responded to the Department's expressed concern with a research proposal designed to find out why so few NZCE students actually made it through to the final certificate stage. The stated aim of the research narrowed the scope to four key options in engineering. More significantly, it introduced the notion of a delay in studies, presumably to incorporate the possibility of temporary withdrawal as an explanation, as well as the permanent withdrawal that the term 'dropout' might imply. The NZCER research proposal gave the objective as follows:

> to determine the reasons why NZCE students enrolled with AAVA since 1973 in the Mechanical, Civil, Electrical and Telecommunications options delay or drop out after completing Stage III.

Again, a preliminary study was envisaged. It was to be carried out in consultation with AAVA and to involve two phases: (a) the collection of data from AAVA records and (b) a mail questionnaire survey of a random sample of NZCE students who delayed or dropped out of their studies. It was thought that the records, by describing the characteristics and progress of students who dropped out, might suggest reasons for dropout that could be investigated in more detail. The questionnaire survey was intended to answer two questions in particular:

1. Why do students stop their NZCE studies?
2. Do they intend to return to their NZCE studies in the future?

The expected outcome was that interested groups would then be able to identify whether a comprehensive enquiry was warranted. But once the work of searching AAVA's records was underway in October 1981 it was soon obvious that the scope of the study would have to be wider. The records showed that more students than anticipated ceased study before completing stage 3. Dropout in the early stages of registered NZCE study therefore became the secondary focus for the research.

A serious research limitation in the AAVA record system quickly became apparent also. The record cards contained no specific information on whether an enrollee was, or had been, a two-in-one or three-in-one student. This made it impossible to obtain from the record data any definite answers to the question: How do school leavers who get a job and embark on part-time study compare with those who do a full-time two-in-one or three-in-one year? Answers to this question, which was a prime focus for the study, would have to depand on the smaller base of information gathered in the questionnaire survey.

Summary

The foregoing account makes it clear that the study developed into a broad search for useful indicators as to why so many NZCE students did not complete the qualification. The accepted evidence was that a high proportion of the initial starters dropped out and, from the outset, the main research emphasis was on finding reasons for this phenomenon. There was also a strong interest in the relationship between dropout and the mode of study, full-time versus part-time. As the collection of record data proceeded the study expanded into a broader enquiry than was originally intended for a short-term, exploratory project. Furthermore the collection of data itself became a much more complex affair, as the next chapter shows.

2 How Dropout Was Investigated

Dropout from New Zealand Certificate courses was identified as a concern over 20 years before the present investigation. In this chapter we review the evidence from several earlier enquiries that were prompted by this concern before moving on to a brief description of the research method used in the NZCE Dropout Study.

Other investigations

The early evidence came from analyses, carried out by the Technicians Certification Authority, in which the progress of students who had no examination success for the previous three years was investigated. The preliminary analysis reported in 1963 showed that 20 to 25 percent of all students registered in engineering and draughting until the end of 1961 were unsuccessful in this way. Of these unsuccessful engineering and draughting students, 49 percent had no passes at all recorded, and only 10 percent had completed the first two years. According to the investigators the figures indicated:

> that a high proportion of the students who enrolled for a technician course in Engineering or Draughting gave up while attempting the subjects of the first two years which do not go beyond University Entrance standard. Further analysis revealed that about one-third of the 635 "discards" qualified for no exemptions, which means that they had not reached even School Certificate standard in any of our subjects. The other two-thirds, however, had qualified for one or more exemptions, and would normally be expected to build satisfactorily on their secondary schooling. (Technicians Certification Authority, 1963, p.11)

More extensive comparisons between registration figures and the number of students with no results after three years were reported in 1966 (Technicians Certification Authority, 1966). These figures confirmed a 'heavy' dropout. For engineering students registered between 1958 and 1962, the number 'who made no progress whatever in the first three years' ranged from 27 to 30 percent of the number registered. But to offset the findings on dropout the Authority presented other figures illustrating 'the tenacity and doggedness of some students' and, incidentally, the problem of defining dropout in the context of technician education. This second set of figures showed, for example, that the students who were awarded a first certificate in engineering at the 1965 examinations came from every registration year from 1956 to 1964 inclusive.

There was other informal evidence. It came from employers who witnessed technicians abandoning their certificate studies or from people who were closely associated with the education and training of technicians (Titchener, 1971; Wild, 1971). In 1971 Offenberger (1979) made a detailed study of successful students, those who had completed their courses to become holders of the New Zealand Certificate. No similar comprehensive survey has been published of students who were not successful in finishing their certificate studies, but no doubt there have been unpublished local investigations of the extent of dropout, for example, within individual technical institutes.

The high attrition rate from NZCE studies was identified recently as a concerning issue within the engineering industry itself. A sharp drop in 1982 in the number who qualified for a New Zealand Certificate in mechanical engineering, contrary to the predicted requirements for technician engineers, prompted the Engineering Industry Training Board to set up a Technician Working Group in November 1983. Their brief was to investigate some of the problems and issues in training for the mechanical engineering industry. The Working Group carried out a survey of 60 companies in the four main centres and of the NZCE qualified staff employed by these firms (Engineering Industry Training Board, 1985). In their report the Group presented recent statistics from AAVA to show that the concern of industry representatives over dropout was well founded. The proportions who dropped out of the mechanical option, the largest group, were calculated as 61 percent (1980), 64 percent (1981), 73 percent (1982) and 86 percent (1983). These calculations of dropout rates were based on the average time taken by the survey respondents to complete the educational requirements for NZCE, which was four years. If five years was assumed as the study period then the dropout rates for the mechanical option were 52 percent (1981), 77 percent (1982) and 73 percent (1983). On either basis the results were seen as 'a very high percentage of initial starters dropping out of NZCE studies'. On this subject the report concluded that:

> The reasons for the high dropout rate, and their elimination, are probably crucial to the objective of achieving greater numbers of technician engineers for industry ... it will be necessary to establish the real reasons for termination of study. This can only be achieved by surveying the people who have terminated their study prior to completion of NZCE.

Nevertheless, the Working Group posited a link between student progress and company attitudes to the amount and scheduling of study time in working hours. Companies in the group surveyed varied considerably in their policy on trainees attending NZCE day release classes. Further, the Working Group's analysis of information from teaching institutions on class hours disclosed that the total amount of tuition time at stage 4 of the NZCE was 'excessive' when compared with the class hours recommended by AAVA or the Department of Education. The high commitment of study time required at that level was suggested as one of the possible reasons for a high dropout of students.

The NZCER/AAVA study, which was an investigation of dropout on a national basis, had been started but not completed at the time of the EITB Working Group's report. In the following sections the research approach and scope of the NZCE Dropout Study are outlined, the research activities are summarized, and some of the important issues that had to be considered in deciding details of method are discussed.

The research approach

The immediate need was for basic descriptive information on the characteristics of those who dropped out or delayed their studies. Several aspects were identified for study in the process of defining the research objectives and from the statistical analyses already carried out. For example, entry qualifications, exemptions, length of study, mode of attendance or study, and course option emerged as potential influences on dropout. Student records supplied this kind of information and would therefore provide the background necessary for a more detailed study of the characteristics, experience, attitudes and reasons for withdrawal in a smaller representative sample. Hence the research strategy adopted was a two-stage one which made use of two sources of information : student records held by AAVA and questionnaire information obtained from a sample of former students.

The options selected

It was decided to confine the study to four New Zealand Certificate options in engineering : Civil, Mechanical, Electrical, Telecommunications. These four options have the largest enrolments within the NZCE course options, but they were not selected because they were thought to have higher levels of dropout than other options or certificates. New Zealand Certificates in engineering were the first to be established and the requirements laid down in the fifties for NZCE courses have tended to serve as a model for developments in other fields. No doubt the longstanding connection between engineering and technician qualifications influenced the selection, but the restriction was also a way of limiting the exploratory study to something manageable. Shortly after the study began, evidence was presented that only a low proportion (11 percent) of advanced students for the New Zealand Certificate in Commerce successfully completed their courses. The suggestion was that the project be extended to include candidates in commerce. But the project resources were already strained by the need to examine dropout in the early, as well as in the advanced, stages of NZCE study. Clearly, the limited funds and staffing did not permit any further widening of scope.

Collection of data from AAVA records

After consultation with AAVA it was decided that the search for the main dropout sample should begin with 1973 registrations and proceed from there. Preliminary investigations of the records indicated that the population for the research would be large, maybe as many as 2,000 students in each of the four NZCE options under consideration. The organization of AAVA's record files made it possible to identify cases and extract data for two discrete groups : (a) those housed in AAVA's file of 'discards' and (b) those still in the current or 'active' file. The two categories had been established by the Technicians Certification Authority and were explained as follows:

> Students are retained on the active list for three years after their last recorded examination success, or until they complete the course they entered for. They are then "discarded", but some appear again at a later date among successful candidates and are restored to the "active" category. (Technicians Certification Authority, 1969, p.5)

Both categories were searched to give a comprehensive listing of students who dropped out over the survey period.

The record data were collected in three batches as research staff were available. A significant delay occurred when a major problem (described below) was discovered in the record system.

Early data collection

Collection and coding of data from records for the period 1973-1977 were carried out between October 1981 and early February 1982. This first batch gave useable information on 2,271 dropout students.

The dummy card problem

During the period 1980-81 AAVA introduced a system of dummy cards, that is, registration cards containing only the name of the student enrolled and the teaching institution. This was done to take account of the students for whom no details were forwarded from the technical institutes or community colleges except the information that the student was studying for an AAVA qualification. No details of *which* qualification were given. This meant that the researchers could not ascertain how many NZCE students were among the 2,071 dummy cards that were found.

The discovery of this large number of dummy cards was an unfortunate set-back with serious implications for sampling procedures in the second stage of the research. Two approaches to overcome the problem were considered. First was the option of ignoring the dummy cards and drawing a sample from the complete cards only. But such a strategy, it was argued, would violate the assumption underlying true random sampling techniques and yield data that could not be generalized to a larger population. Second, there was the option of assisting AAVA to collect the missing data from the teaching institutions, thereby enabling the relevant dummy card cases to be included in the random sampling procedure. It was considered that the second option would give a firm base upon which to make valid generalizations. With extra financial provision it became possible to pursue the second and preferred approach of visiting the technical institutes to obtain the missing information.

Visits were made to six teaching institutions between February and May 1982 for this purpose. As a result, information was obtained to complete AAVA's records on 2,071 students. Through this exercise another 108 NZCE students from three institutions were located for the dropout sample.

Later data collection

In February and March 1982, the second batch of record data was gathered for 2,344 students who stopped studying during the period 1978 to 1980. The first stage of the study was completed by May 1982 with the addition of a final batch of data covering 585 students for the years 1973 to 1980.

In all, useable record data were obtained for 5,200 students who withdrew from NZCE courses between 1973 and 1980. Some preliminary analyses of these stage one data were carried out in August 1982.

The questionnaire survey

Progress during the second stage of the study was fragmented. Preparation for the postal survey began in September 1982 with the drawing of a sample and the development of a questionnaire, but lack of research staff halted work for six months.

The sample

The target set for the postal survey was a sample of 500 out of the population of 5,200 dropouts. The initial sample of 692 cases, drawn randomly by the computer, allowed for a 40 percent loss from lack of response and inability to trace people. The sample was representative in terms of NZCE options, school qualifications, year of registration and sex, but the low representation of women (only 3 percent) did not permit meaningful analyses based on sex. Accordingly, an additional selection of 64 women was included to give a potential total of 85 females, an 11 percent representation. This addition made a total of 756 students for the survey sample.

Locating respondents

The work of confirming or updating home addresses and workplaces given on AAVA records began in June 1983. Form letters seeking current information were sent to employers and private addresses. Many kinds of employer were approached in the search for former students : government ministries and departments, local government bodies from small county councils to large city councils, regional authorities, hospital boards, electricity authorities, catchment boards, education boards, secondary schools, universities, the armed services, public corporations, manufacturing and service industries of all kinds and other organizations and bodies. As well, students were widely dispersed over the whole country. The four NZCE options being studied were clearly meeting a national need both in industrial scope and geographical distribution.

The majority of employers responded promptly to the enquiries for information. Follow-up letters were sent to those who were slower to respond. As addresses were confirmed or supplied, letters were sent to 478 potential respondents inviting participation in the questionnaire survey. Respondents were asked to indicate their acceptance on an enclosed postcard and second requests were sent where necessary.

As expected, tracing all the students proved difficult : from the invited sample of 478 former students, 267 agreed to participate and were sent questionnaires.

The questionnaire

A questionnaire[2] consisting of 33 questions was used to obtain more detailed information on the work and study experiences of the former NZCE students. The questions were divided into four sections covering:

1. School background and qualifications.
2. Details of NZCE study, including forms of tuition, difficulties experienced, reasons for withdrawal and intentions regarding future study.
3. Employment during study.
4. Attitudes to study and work.

Most of the questions were the closed-response type in which the respondent provided factual information or selected an appropriate answer from pre-coded responses. Several variations of response were used : two-way (yes/no), multiple choice, checklist, rating scale, and combinations of these. Some questions made provision for additional qualitative comments, particularly the questions which tapped course changes, subject difficulties, obstacles to study and reasons for stopping study. The final question invited written general comments on 'why some students withdraw from their NZCE studies'.

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[2] See Appendix 2.

Response

Questionnaires and letters explaining the survey were sent to respondents as they notified their willingness to participate. Despite written follow-up requests during the questionnaire survey period from September 1983 to January 1984, there was a low response rate : questionnaires were returned from 168, that is, from 35 percent of the invited sample of 478, or 63 percent of the 267 who agreed to take part. The true response rate probably lies somewhere between 35 percent and 63 percent if, as seems probable, some addresses to which invitations were sent were long out of date.

Data analysis

Again, lack of staffing caused the study to be suspended from March 1984 and a year elapsed before the data analysis proceeded. Further computer analyses of the research data collected in stage 1 of the research were undertaken in March, April and June 1985, using the Statistical Analysis System (SAS) computer package. The quantitative data from the questionnaires were analysed in the same way between April and June 1985. A content analysis was made by hand of the qualitative responses in the questionnaires, using a coding frame which was devised for the purpose.

Reporting

The report of findings from the two sets of data was written between April and July 1985. In early July a summary of the main research findings was prepared and discussed with the Director of AAVA in order to clarify points and check interpretations.

Methodological considerations

Limitations

It could be said that the decision to base the study on existing records supplemented by a questionnaire survey limited the research more than was desirable. There was a risk that records might be inadequate and would curtail what could be said about the characteristics of the group under investigation. Further, reasons for dropping out of courses might touch on sensitive, personal matters which are not readily disclosed on a questionnaire.

These limitations were recognized. For example, the possible reasons for dropout listed in the questionnaire emphasized the more conventional areas of motivation, relevance, job and commitments. It was felt that other factors less directly related to course or study are better explored by interview. Nevertheless it was hoped that some of the reasons that were not course-related and other more complex reasons, for example, concerning personal relationships, job conflicts or obstacles, and family events, would emerge in written answers to the open questions.

The two-pronged research approach combining records and a questionnaire had one major advantage : it allowed a wide canvassing of information from more than one source, an approach which seemed appropriate for an exploratory study.

Defining dropout

There is one issue which pervades the study and its findings: that is the question of how or when to classify a student as a dropout. Offenberger (1979, p.39) discussed the problem:

> The TCA defined students as 'active' if they had at least one examination success recorded within the preceding 3 years. When, as is the case, a significant number complete their certificates 8, 9 or even 10 years after their initial registration - and often for reasons not implying failure - it is impossible to define a cut-off point and to classify a registered student as a 'drop-out', even when he is no longer 'active'.

Only a lengthy follow-up study, he claimed, would make it possible to classify a person meaningfully as a 'drop-out', let alone as unsuccessful. The constraints of the present research dictated a less elastic cut-off in identifying an appropriate group for preliminary study. The AAVA criterion of no evidence of study for three years was accepted as the working definition of a dropout; but it was obvious that the validity of such a definition would need to be reviewed in the light of the information gathered.

Summary

Analysis of student progress in the 1960s revealed a high level of dropout from NZCE studies. Similar analyses reported recently confirmed the high attrition rate, especially for courses in mechanical engineering.

The present study was designed to provide descriptive information on a national sample of students who dropped out of courses for engineering technicians and to explore their reasons for doing so.

The research was carried out in two stages to provide two sets of data about New Zealand Certificate in Engineering students who registered with the Authority for Advanced Vocational Awards between 1973 and 1980. One set of data gave basic information on a large group; these data were collected from AAVA records, technical institutes and community colleges for 5,200 NZCE students in four options - Civil, Mechanical, Electrical and Telecommunications. The second set of data gave more detailed information on a small group. These data were obtained from questionnaires which were mailed to a sample of 267 former students who could be traced and who were willing to participate.

3 The Students Who Dropped Out

Student records were the first source of information for this exploratory study of dropout from New Zealand Certificate in Engineering courses. In this chapter we describe briefly the registration process and the nature of the records kept, before focussing on the students behind the records. The information about the students is presented in two parts : the first part, in this chapter, concerns the background characteristics of the students, or the qualities they brought to their courses; and the second part, in Chapter 4, deals with the details of students' course options, and their progress and achievement before dropout. The information from the records is discussed in Chapter 5.

Registration and records

Before 1972 all students taking subjects for examinations approved or set by the Technicians Certification Authority were required to register before attempting the examination. Initially registration occurred at the beginning of the academic year:

> students would enrol at a technical institute and many, particularly those taking classes in subjects of the first two years, would for various reasons cease to attend. Once this shake-down period was over, usually by the beginning of the second term, the remnant could be regarded as serious students. It later became practice to register them at that stage.
> (Offenberger, 1979, p.39)

In March 1973 the Authority reported that 'the keeping of a student register had become a major task' with the number of students increasing annually by about 20 percent (Technicians Certification Authority, 1973, p.9). It was also felt that registration in the early stages restricted students unduly in planning their courses. For these reasons, from 1972, students were not required to register until 'the year in which they were eligible to take a Year III subject'. Students would then enrol with a teaching institution, usually in early February, at the start of their course. Once they reached the third stage and became eligible for registration they would then apply to their teaching institutions to be registered with the Authority.

In 1980 the registration requirement altered again, reverting to the earlier pattern whereby students had to be registered with the Authority for all levels of study including stage 1 and 2. Registration was still arranged by the student's teaching institution. At some stage after 1972 the time of registration also reverted to the beginning of the year, and the present requirement is for registration to be completed by 31 March each year.

In 1975 the Authority installed a 'randomatic' card retrieval system machine and the existing student records were transferred to appropriate cards (Technicians Certification Authority, 1975). These record cards for students registered from 1973 to 1980 provided the raw data for this study. Card registrations gave way to computer-based student records in 1982.

Information obtained from the records

Three items of information were used initially to identify appropriate records for the study:

1. The certificate (NZCE).
2. The option (Civil, Mechanical, Electrical, Telecommunications).
3. The year of registration, 1973 to 1977. This period was later extended to 1980 inclusive.

Additional information was then taken from the cards which met the selection criteria: information on sex, date of birth, highest entry qualification, and details of course progress and achievement. The required information was not always available or easily extracted. Some record cards, for example, made no provision for recording the student's sex. The adequacy of the record data is discussed more fully in Chapter 5. What should be borne in mind is that from 1973 to 1979 details of the early stages of the student's course were held only by the teaching institution. The teaching institutions might have notified the Authority, as required, that students had completed the first two stages of the NZCE, but it seems that some details concerning students' stage 1 and 2 courses were either not passed on by the teaching institution or were not noted on the Authority's student records.

Information on the student's teaching institutions was used to obtain missing data for dummy cards as outlined in the previous chapter, but the institutional variable was not itself coded for analysis. Similarly, information on job and employer was used in tracing the sub-sample of potential respondents for the questionnaire study, but employment details were not extracted for the main bulk of the record sample. This meant that analyses to show the array of students' jobs could not be carried out. Nor could the range of employer organizations be depicted in terms of size, type and whether in the public or private sector.

Analysis of the record data

The data obtained from the student records were first organized in the form of frequency tables, which showed the number of students who were male or female, the number who had School Certificate, University Entrance or some other qualification when they started, how many dropped out of each option, and so on. Then the major variables or attributes were cross-tabulated, that is, they were combined in contingency tables, showing, for example, the entry qualifications for each course option, or how many in each option had completed the first two stages. A statistical test, the chi-squared test, was applied to see whether the two attributes so combined were significantly associated in their distribution or were independent of each other. The test showed, for example, whether the distribution of entry qualifications was 'contingent' or dependent on the option being studied. Other statistical tests were used to measure the strength of the association.

The results of these analyses are described in the following sections.

Student characteristics

Sex

The dominant characteristic of the dropouts was their male sex. Of the 5,200 students in the sample, 4,938 were male and 152 were female. The sex of the remaining 110 students was not recorded. The high proportion of males (97 percent) is typical in courses for engineering technicians. In 1983, for example, 96 percent of the registrations with AAVA for NZCE advanced courses were males (Department of Education, 1984). The same imbalance of the sexes in the dropout sample was evident for each year of registration between

1973 and 1980, except for 1979 when the proportion of males dropped slightly to 95 percent.

Thus males and females dropped out of the certificate stream in much the same proportions as they entered. These proportions no doubt reflect patterns of recruitment and the traditional attitudes held by students, employers and society concerning vocational choice and employment opportunities for males and females.

Age

Another noticeable characteristic of the students in the dropout sample was their youth. Although their birth years spanned 44 years from 1920 to 1964, almost two-thirds were born in the decade between 1955 and 1964. The ages of students at registration are shown in Table 1.

Table 1 *Student age at registration*

Age in years	Number of students	%
Under 19	1,214	23.7
19-20	1,464	28.6
21-25	1,389	27.1
26-30	594	11.6
Over 30	458	9.0
Total	5,119	100.0
No Information	81	

Just over half (53 percent) were under 21 years when they registered for NZCE study and well over three-quarters (79 percent) were no older than 25 years.

As a group the women were notably younger than the men: 76 percent of them were under 21 years when they registered, compared with 52 percent of the men. Offenberger's (1979) study of New Zealand Certificate holders also revealed 'striking differences in age of entry between men and women enrolled on similar courses' (p.101). He related the earlier starting age of women to the school leaving pattern of secondary school pupils: 'Girls leave school earlier, and hence start on their tertiary education earlier' (p.101).

Length of attendance at school may be one factor that accounts for the difference. As well, the late entry of men may indicate different patterns of career development with more men than women starting their certificate studies as part of a 'second choice' career. Another likely explanation for the difference is that the catchment pool for male students is larger than it is for females. That is to say, NZCE courses draw their men not only from school leavers and young technician trainees but also from older men within the technician workforce who presumably want to improve their qualifications. Mature tradesmen with appropriate trade qualifications could normally expect to be exempted from some subjects of the first two years and were thereby encouraged to embark as late entrants on certificate courses.

Qualifications at entry

For a sizeable number of cases, the records gave no details of entry qualifications, and in some respects when the information was given, it was not precise. For example, some of the older students would have gained their School Certificates under the old system which was in operation from 1944 to 1969, whereas others would have qualified within the new system which recognizes single subject passes. But a check against 'School Certificate' on a student record does not distinguish between these two groups; nor does it indicate if the School Certificate was in one subject, two subjects, or three or more subjects. Similarly, it is not clear whether 'university' means the entrant had attained a formal qualification or merely one or more units or credits. However, it is possible to consider the information on qualifications in terms of the *level* obtained, and the highest qualification levels recorded for the sample students are shown in Table 2.

Table 2 *Qualifications at entry*

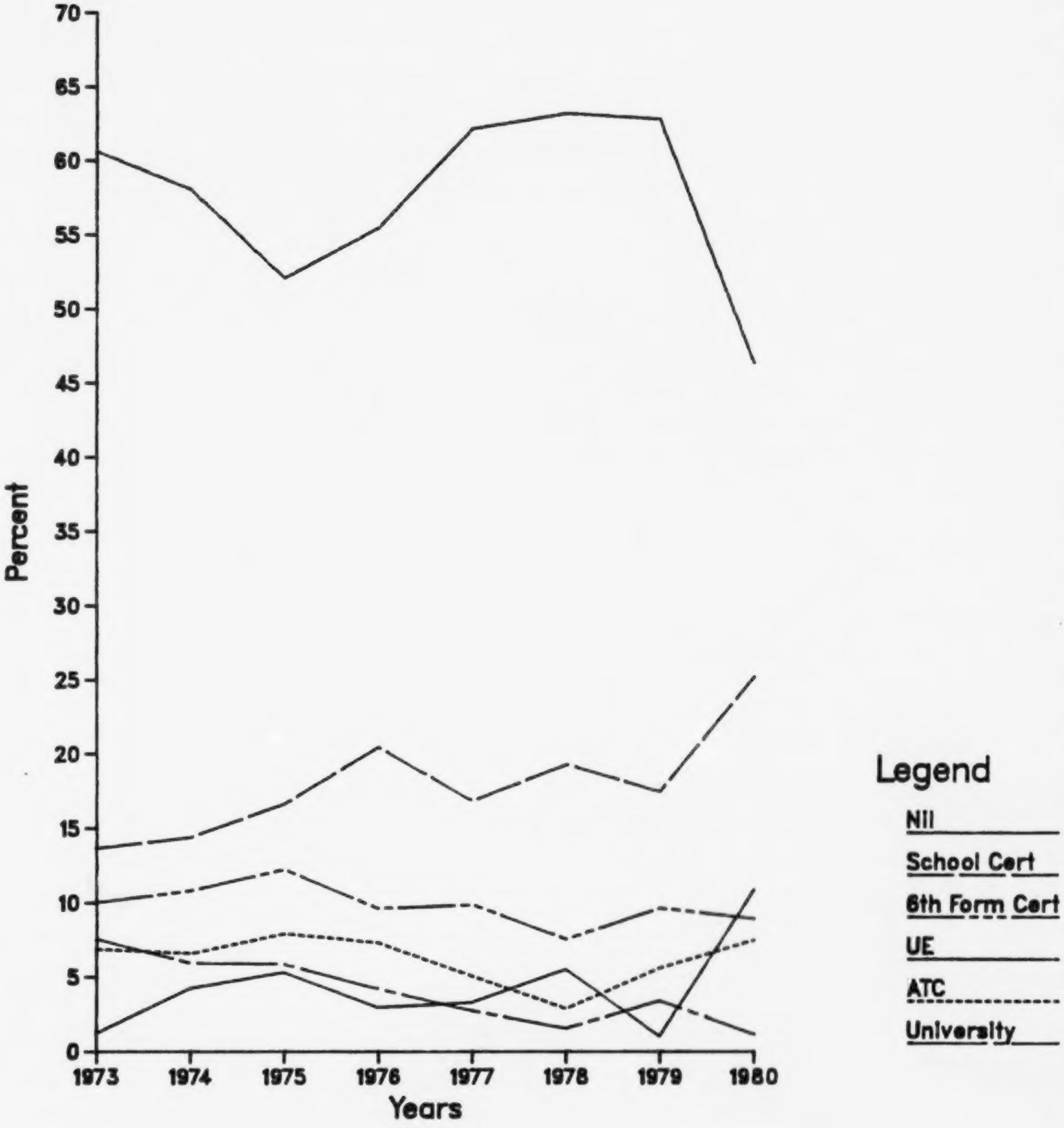
Level	Number of students	%
No formal qualification	246	5.1
School Certificate	911	19.1
6th Form Certificate	464	9.7
University Entrance	2,688	56.2
Advanced Trade Certificate	303	6.3
University	172	3.6
Total	4,784	100.0
No information	416	

The available information on entry qualifications was limited in other ways as well. The six categories of qualifications that appeared on the record cards and were coded for analysis were 'nil', 'S.C.', '6.F.C.', 'U.E.', 'A.T.C.', and 'Uni.'. Neither the 'Trade Certificate' nor the 'Technicians Certificate' was listed among the possible qualifications, and therefore there are no data on the numbers in the sample who began their certificate studies after passing the Trade Certificate examination or completing the three-stage Technicians Certificate course. The only entrants from the trades identified by qualifications on the records were those who had gained the Advanced Trade Certificate. There was no provision for overseas qualifications or for identifying instances where these had been equated with corresponding local certificates. We cannot be certain either what other considerations were operating when entry qualifications were recorded. For example, an analysis reported by the Technicians Certification Authority in 1967 of qualifications from student registration forms indicated that:

> Only one entry was made for each student; and preference was given to an academic qualification (S.C. or U.E.) rather than to a trade qualification if a student had both. (Technicians Certification Authority, 1967, p.7).

School qualifications. Ninety-five percent of the sample had achieved School Certificate level or higher and 56 percent had University Entrance (Table 2). An unexpectedly high proportion of students who registered with no qualifications came from the over-30 age group. Figure 1 shows the entry qualifications for each year of registration from 1973 to 1980. It can be seen that the number who entered with University Entrance dropped to 46 percent in 1980. Conversely, the number who enrolled in 1980 without any formal school qualification was twice the number that might be expected. The 1980 variation is explained by a change in the registration regulations which extended the registration requirement to include stage 1 and 2 courses from that year. The effects of this change are discussed more fully in later sections.

Figure 1
Qualifications for Registration Years 1973-80



Considering that the proportion of all students who left school with University Entrance over the same period ranged from 12.5 percent in 1973 to 15.8 percent in 1980[3] it is obvious that the students in the dropout sample were a highly qualified group in terms of their pre-entry achievement. Moreover, they were comparable in school attainment with the successful certificate holders studied by Offenberger, 56 percent of whom had also passed University Entrance.

A higher proportion of female students had University Entrance when they started the NZCE course (Table 3). This finding is consistent with the sex difference found by Offenberger for certificate holders, although the superior scholastic achievement of the women entrants was not as marked in the dropout sample.

Table 3 *Highest qualification level by sex (N = 4,705)*

	Nil %	S.C. %	6th F.C. %	U.E. %	A.T.C. %	Uni. %	Total N	 %
Male	5.1	19.1	9.7	55.9	6.5	3.7	4,559	100.0
Female	2.7	15.7	11.0	67.1	2.1	1.4	146	100.0

χ^2 = 12.27, 5 df, $p < .05$, differences probably significant

School qualifications were more closely associated with age than with sex. Fewer of the older students had University Entrance : only 20 percent of those who were over 30 years when they registered, compared with 67 percent of the under 21-year-olds. This difference suggests that the older students in the dropout sample may have been mainly male early school leavers who went into the trades.

Post-school qualifications. In general, 6 to 7 percent of the overall sample began their courses each year with an Advanced Trade Certificate, although the proportion declined to 5 percent in 1977 and was down to 3 percent in 1978 (see Figure 1). The dip was possibly due to the introduction of extended trade training in 1976 which reduced the ease of transition from trade to technician classes.

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[3] Source: Department of Education, *Education Statistics of New Zealand*, 1973 - 1980.

A decline in the number of older entrants from the trades may also have contributed to the reduced proportion. Nearly half of those with the trade qualification were born before 1950; a third were over 30 years when they registered for NZCE study. As Offenberger (1979) noted, these tradesmen were more likely to have left school early, and their success in trade examinations 'had often provided the first stimulus that led them toward New Zealand Certificate studies' (p.52). However, very few dropouts from the civil engineering option would be expected to have a trade background, because, with no tradesmen in that field, there was 'no opportunity to move from an allied trade into a certificate course' (p.48).

Only 3.6 percent had university experience before commencing NZCE study. This is a much smaller proportion than the 18 to 19 percent Offenberger (1979, p.57) reported for his 1971 sample of successful New Zealand Certificate holders. Nor were the students with previous university experience spread evenly throughout the registration period under study; in fact their number declined fairly steadily from the 7 percent who registered in 1973 to 1 percent in 1980 (see Figure 1). Half of the ex-university students were in the 21-25 year age group at the time of their registration.

It is not known whether the proportion of ex-university students entering NZCE courses has lowered overall. Offenberger (1979) predicted that more school leavers could make a technician's career their first choice as the New Zealand Certificates gained wider acceptance by the community. The reduced proportion of ex-university students in the dropout sample could be reflecting such an effect.

Summary

The main characteristics of the dropout sample of 5,200 NZCE students taken from AAVA records may be summarized as follows:

1. Male and female students dropped out of NZCE courses in the same proportions as they entered, with males heavily outnumbering females.
2. More than half (53 percent) were under 21 years old when they registered (Figure 2). The women were generally younger than the men (Figure 3).

3. The students who dropped out were well qualified scholastically, with more than half (56 percent) possessing University Entrance at entry (Figure 4). Only a small proportion with the Advanced Trade Certificate took up NZCE studies each year (6-7 percent). The proportion of ex-university students was even smaller (3.6 percent) and declined over the survey period.
4. Proportionately more of the women and younger students had University Entrance when they started their courses (Figures 5 and 6).

Figure 2

Student Age at Registration

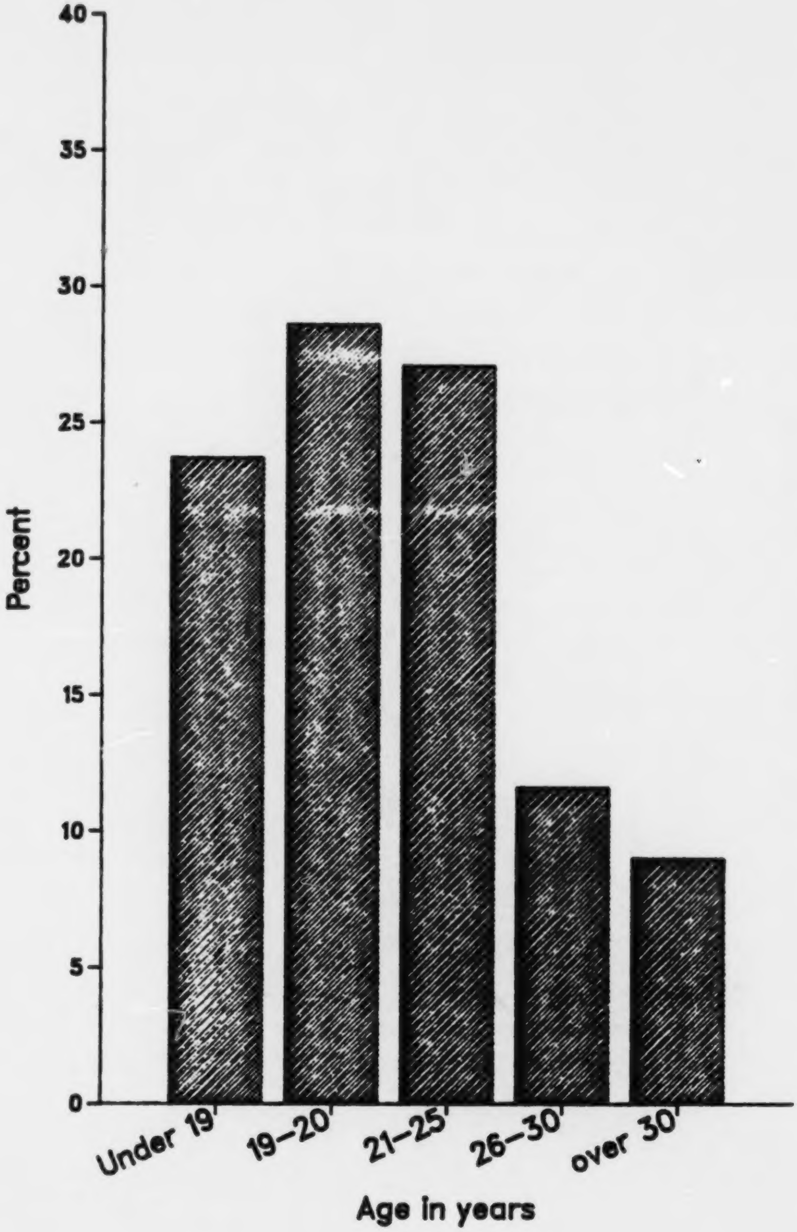


Figure 3
Student Age at Registration by Sex

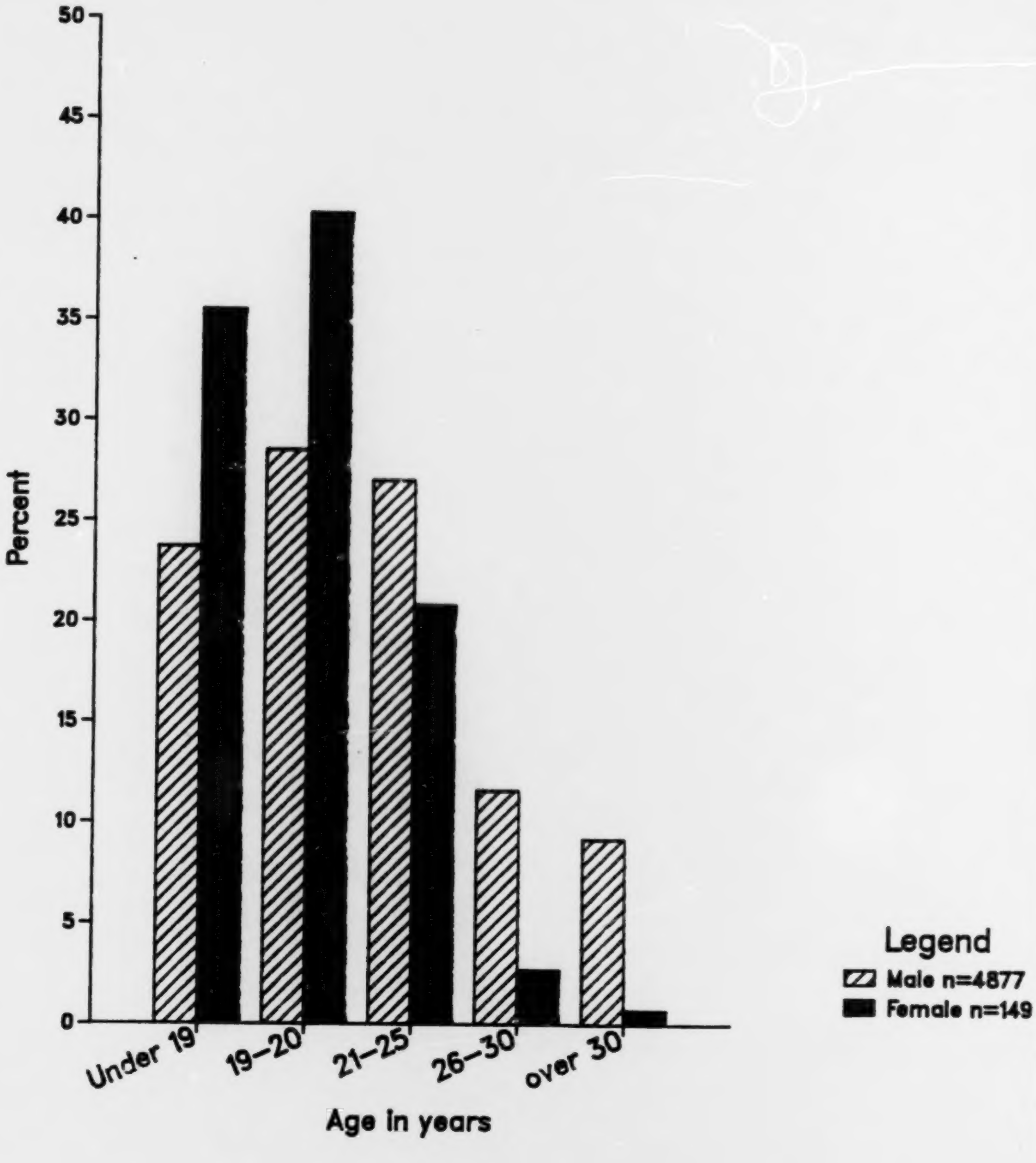


Figure 4
Qualifications at Entry

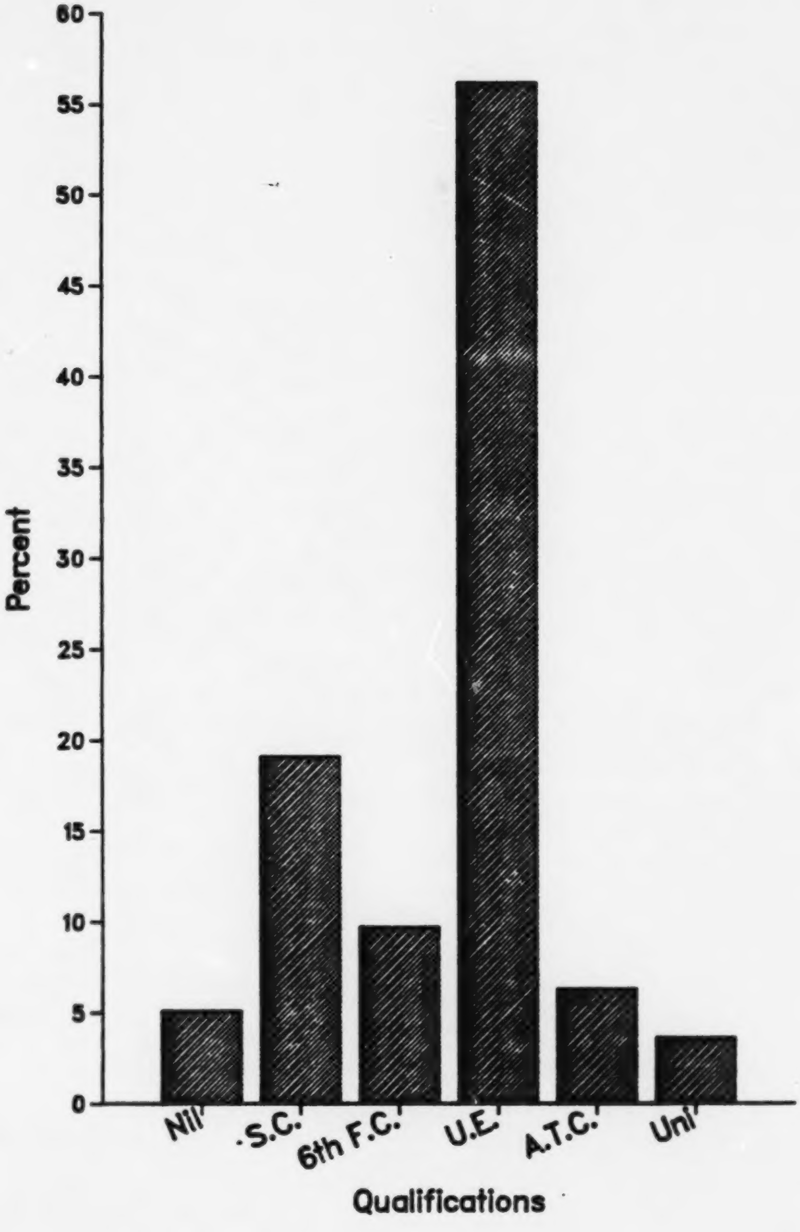


Figure 5
Qualifications at Entry by Sex

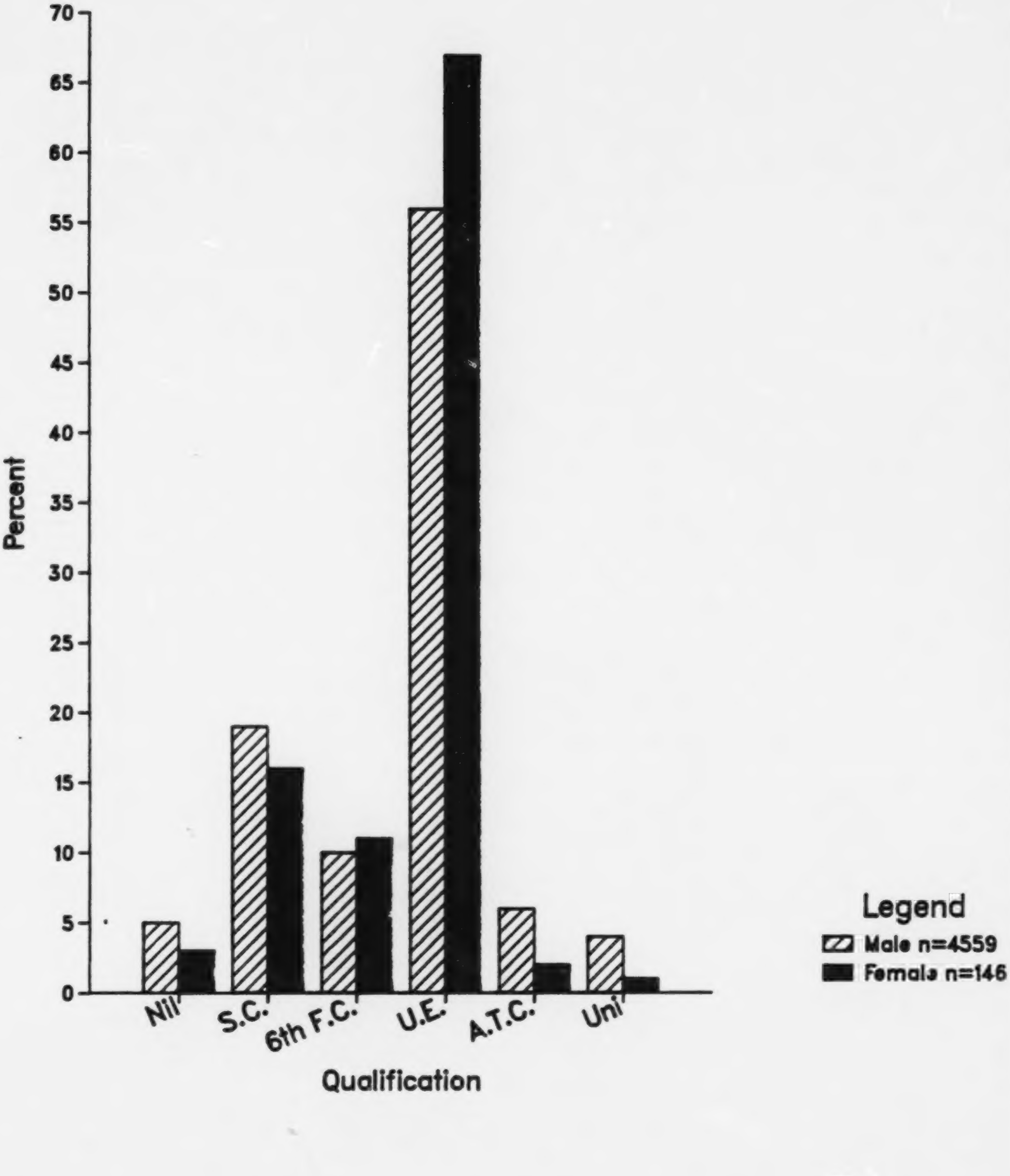
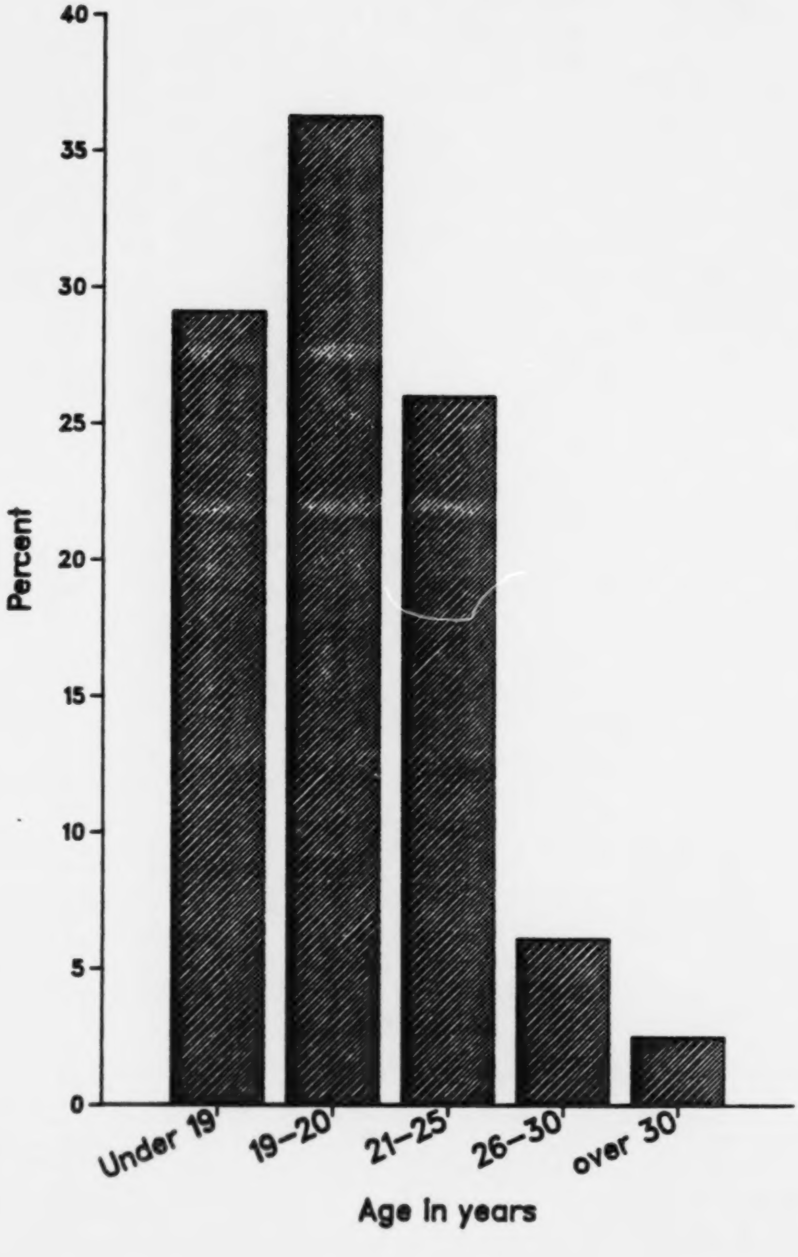


Figure 6
University Entrance Holders by Age at Registration



4 Progress And Achievement Before Dropout

In presenting the information from student records we have concentrated so far on the background characteristics of the students who dropped out. Now we turn to their experiences of study for the New Zealand Certificate in Engineering. First, we examine which option they were studying, before considering how long they spent studying and how far they got before withdrawing.

Option

Were the students who dropped out evenly distributed in the four engineering options in the research sample : Civil, Mechanical, Electrical and Telecommunications? The numbers in each option are shown in Table 4.

Table 4 *Proportion of dropouts in each option*

Option	N	%
Civil	1,100	21.2
Mechanical	1,647	31.8
Electrical	1,188	22.9
Telecommunications	1,248	24.1
Total	5,183	100.0
No information	17	

Students in the Mechanical option formed the largest proportion, accounting for approximately one-third of the dropout sample. The other options contributed smaller proportions, with that from Civil being the smallest.

For some options the proportion of dropouts fluctuated markedly according to the year of registration (see Figure 7). For example, Civil dropouts, who formed 21.2 percent of the overall eight-year sample, accounted for only 14.7 percent of the 1979 registration group and 15.9 percent of the 1980 group. The proportion of Mechanical dropouts was much the same in 1980 (34.3 percent) as it was in 1973 (35.6 percent), although the middle years of the period showed a definite trough. This dip probably reflects the drop in registrations for the Mechancial option due to employment problems when some major employers cut back on trainees. AAVA's registration figures show that in 1975 there were only 7 new registrations for Mechanical compared with 283 in 1974 and 314 in 1976 (Technicians Certification Authority, 1974, 1975, 1976). Even so, the highest proportion of dropouts came from the Mechanical option for each year of registration except 1977 when Telecommunications had 1 percent more. The proportion of Electrical dropouts climbed from 17.5 percent in 1973 to 26.0 percent in 1980. For Telecommunications, the proportions fluctuated between 17.0 percent and 29.2 percent with no clear trends apparent.

One way to find out why more students dropped out from one option compared with the others is to look for clues in the composition of the four options or the characteristics of those studying them. For example, were students in the Mechanical option as highly qualified at entry as students in other options? Did the options vary in their age or sex composition?

An analysis of the highest *levels of entry qualification* for each of the four options (Table 5) showed that slightly more of the students who dropped out of Mechanical had no school qualification when they started. The Mechanical option also contained more with School Certificate and 6th Form Certificate as their highest level compared with the other three options. Students with University Entrance appeared in higher proportions in Civil and Telecommunications compared with Mechanical or Electrical.

In contrast, the two last named options had more students with a trade qualification: the Electrical option had over twice the proportion with an Advanced Trade Certificate as the Mechanical option, while Civil and Telecommunications had only low proportions. Indeed the differences among

Figure 7

Dropouts by Option for Registration Years 1973-80

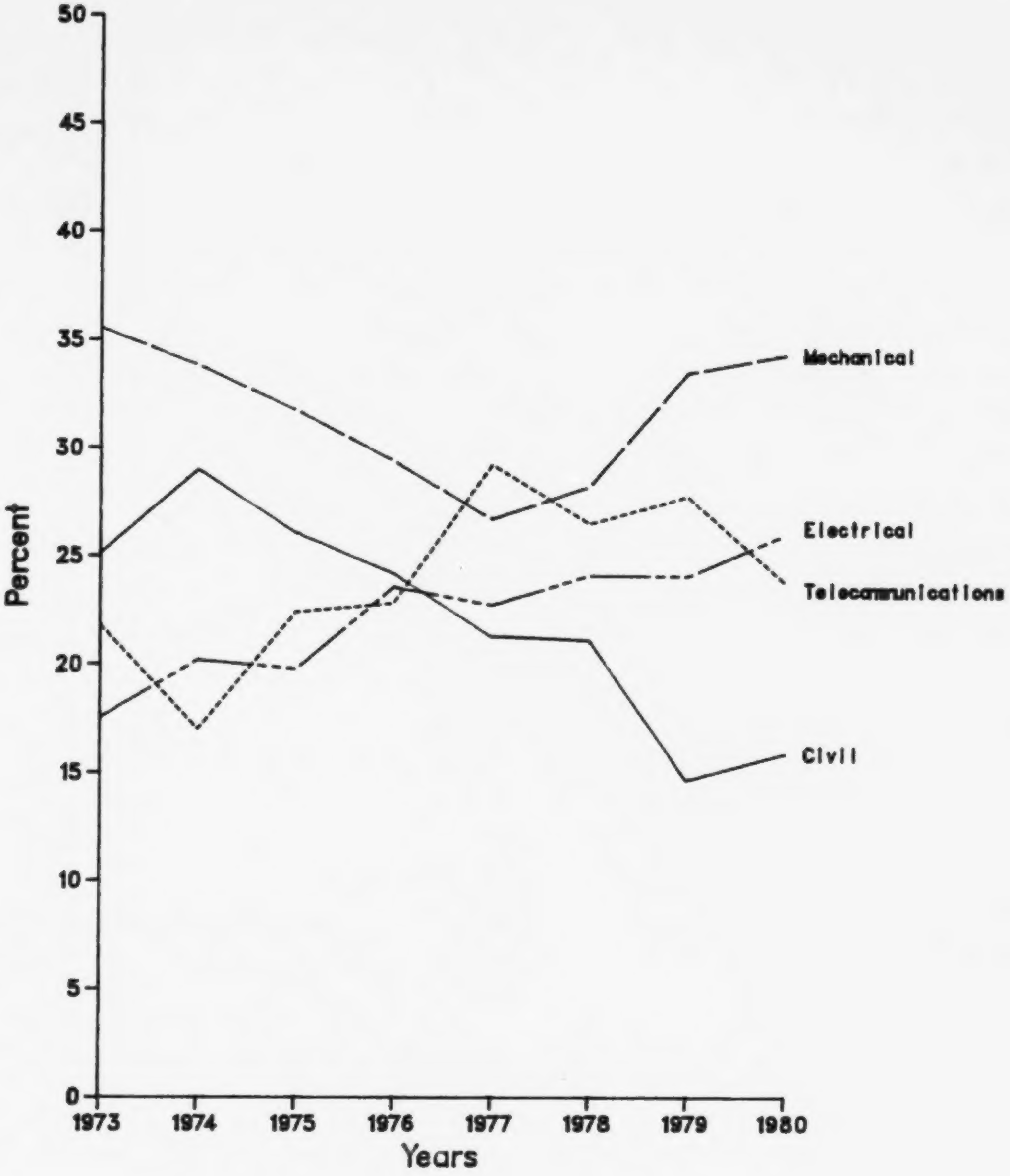


Table 5 *Highest level of entry qualification by option (N = 4,782)*

Option	Nil %	School Certificate %	6th Form Certificate %	University Entrance %	Advanced Trade Certificate %	University %	Total N	 %
Civil	5.1	14.6	11.4	63.1	1.4	4.4	1,024	100.0
Mechanical	5.9	21.8	12.1	50.5	6.5	3.2	1,533	100.0
Electrical	5.0	19.0	8.6	49.6	14.2	3.6	1,089	100.0
Telecommunications	4.3	19.3	5.9	64.0	3.1	3.4	1,136	100.0

$\chi^2 = 257.51$, 15 df, $p < .0001$, differences highly significant the options were greater for trade qualifications than they were for school qualifications, the reason being the lack of an allied trade for some fields like Civil as noted earlier. The options differed little in the number with a qualification at university level.

It seems that the mechanical students who dropped out had not gained as high a level of school qualification as dropouts from the other options. Further, the Mechanical option did not include the compensating numbers with an advanced trade qualification that there were among the students studying the Electrical option. This difference probably reflects the fact that electrical apprentices are obliged to pass trade examinations whereas mechanical apprentices are not (Offenberger, 1979).

A *sex* breakdown of the options revealed that, although all the course options were male-dominated, there was a lower proportion of women in the Mechanical option than would be expected by chance, and a higher proportion in the Civil. In fact, 40 percent of the women who dropped out compared with 21 percent of the men, were studying Civil engineering; 15 percent of the women and 32 percent of the men were Mechanical students. It is hard to know whether, or to what extent, the smaller proportion of Civil dropouts overall and the larger proportion of Mechanical dropouts reflect the difference in sex composition.

When the *age* composition of each option was analysed some distinguishing features emerged, as Table 6 shows. The Civil dropout group was the youngest with two-thirds under 21 years at registration. The Mechanical group was also relatively young but had a lower proportion of 19- to 20-year-olds than Civil. The Electrical sample contained proportionately more of the older dropouts than the other options. The largest cluster of Telecommunications students was 21-25 years at registration; few of the students who dropped out from this option were school leavers in the 16-19-year-old group.

Table 6 *Age at registration by option (N = 5,117)*

Option	Under 19 %	19-20 %	21-25 %	26-30 %	Over 30 %	Total N	 %
Civil	29.3	36.2	21.4	7.5	5.6	1,086	100.0
Mechanical	29.6	29.4	22.2	10.2	8.6	1,628	100.0
Electrical	21.0	26.1	23.9	15.6	13.4	1,170	100.0
Telecommunications	13.5	23.3	41.8	13.2	8.2	1,233	100.0

$\chi^2 = 342.19$, 12 df, $p < .0001$, differences highly significant

Years studying

Length of study is related to entry qualifications. Students with appropriate school or post-school qualifications can expect to be exempted from some stage 1 and 2 subjects and therefore to complete the certificate course in three years minimum rather than five. This link has obvious advantages for employers, and performance in University Entrance in subjects giving exemptions from the first two years can be a crucial factor in their recruitment policies and procedures. The exemption policy of AAVA and the Technicians Certification Authority is discussed later in this section. Unfortunately, the records did not identify clearly which students were associated with different length courses and no clear-cut variable for length of certificate programme could be coded.

The records gave information on three variables to do with the years the students spent studying for the NZCE: the year the student registered, the last year of recorded study and whether or not there were any breaks in study between the start and the finish. A fourth variable, the duration of study, was created by subtracting the year of registration from the final year of study. It should be noted that the duration of study was not a precise measure of the total time spent studying in NZCE courses as this variable took no account of breaks; it was simply a gross definition of the period, from registration to withdrawal, during which the student studied, either continuously or intermittently.

When did they start and finish?

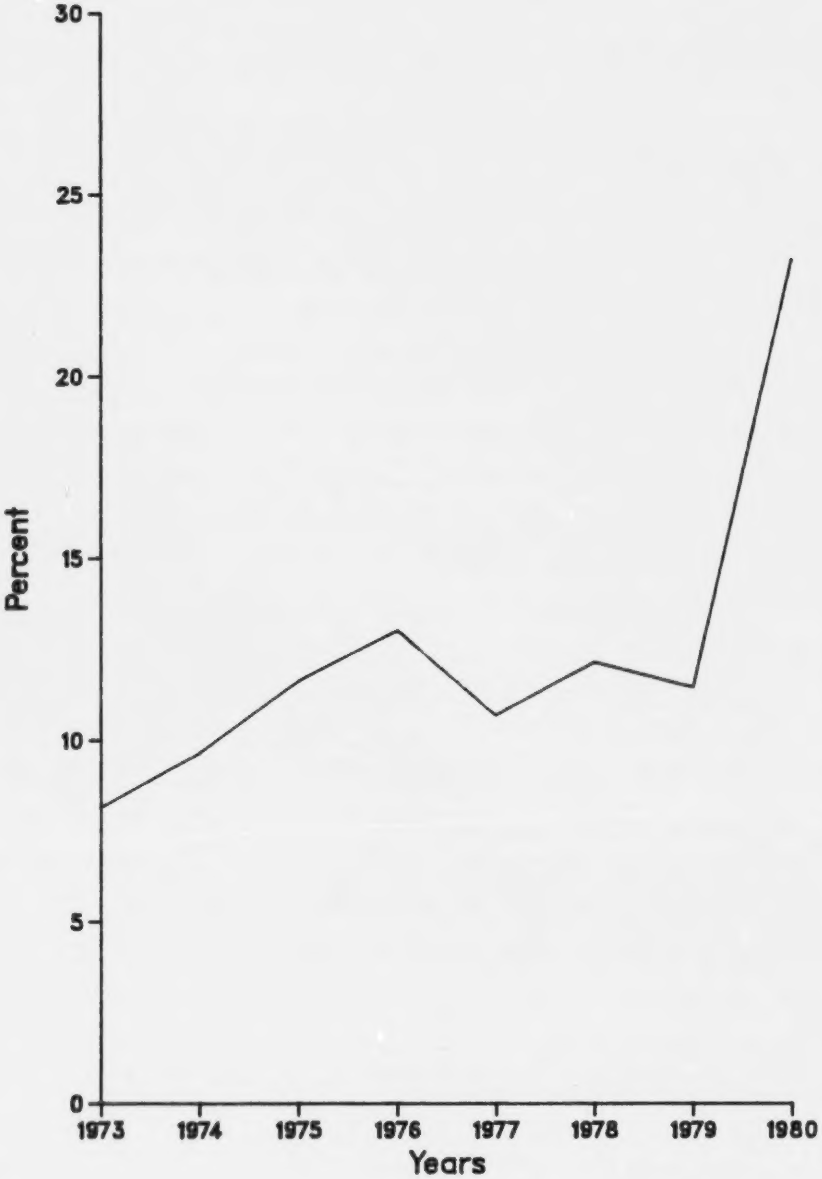
The number from the sample who registered each year and the number who withdrew from their studies each year are given in Table 7.

Table 7 *Registrations and withdrawals for dropouts, 1973 - 80*

Year	Registered		Withdrew	
	N	%	N	%
1973	422	8.2	259	5.0
1974	500	9.6	330	6.4
1975	603	11.6	500	9.7
1976	675	13.0	614	11.8
1977	554	10.7	584	11.3
1978	630	12.2	661	12.7
1979	594	11.5	732	14.1
1980	1,203	23.2	1,503	29.0
Total	5,181	100.0	5,183	100.0
No information	19		17	

It can be seen that the dropout sample included a disproportionate number of 1980 registrations. The proportions for 1975-79 were fairly stable, but the 1980 registrations showed an increase of 103 percent. The dramatic rise in the proportion of the sample accounted for by the 1980 registration year is shown clearly in Figure 8. One possible explanation is that the increased number of dropouts resulted from increased enrolments in that year. Figures for 1979 and 1980 confirm that the total number of new registrations for the four relevant engineering options increased from 1,138 in 1979 to 1,980 in 1980, a lift of 74 percent (AAVA, 1981). The rise in dropouts also coincided with the transfer to the new authority, AAVA, in 1980 and a consequent change in the regulations governing registration. From 1972 until 1979 students were not required to register when they began one of the Authority's courses, but only when they began studying at stage 3 (Technicians Certification Authority, 1979). From 1980, however, students had to register from the first stage of a New Zealand Certificate course. It was this new requirement which produced the upsurge in new registrations, not just from those enrolling

Figure 8
Dropout Registrations 1973-80



for the first time, but also from an accumulated backlog of previously unregistered students who had studied at stages 1 and 2.

The possibility that the dropout sample might have been inflated spuriously by the inclusion of 1980 registrations cannot be discounted either. The main search of the records for dropouts from the 1978-80 registration period was carried out in early 1982, which means that the criterion of no evidence of study for three years was not strictly adhered to in the case of students who registered in 1980. That is to say, the 1980 registrations in the sample may have included some who should not have been classified as dropouts.

The increase in registrations resulting from the 1980 change in regulation described above also explains the disproportionate number in the sample who, as shown in Table 7, terminated their studies in 1980. Before 1980 the dropouts came from only one pool of registrations, those who registered for the first time when they became eligible to study at stage 3. But in 1980 the pool of potential dropouts widened to include two new pools: (a) students enrolling at stage 1 and 2 with a teaching institution for the first time in 1980 and registering with AAVA at the same time; and (b) previously-enrolled students continuing their studies at stage 1 or 2 in 1980 but registering with AAVA for the first time. Hence the marked rise in the number who dropped out in 1980. Just as registration numbers peaked in that year because of the once-only impact from the backlog of previously enrolled but unregistered students, it is highly likely that dropout numbers would show the same pattern.

Not surprisingly, the addition of stage 1 and 2 students gave the 1980 group of dropouts a large weighting of younger students: 46 percent of the students who registered in 1980, and 42 percent of those who withdrew in that year, were aged 16 to 20 years.

Duration

The time from registration to withdrawal ranged from less than a year to seven years, but for over three-quarters of the students this period lasted less than a year (Table 8). It cannot be assumed, though, that these students spent less than a year in study overall as it is not evident how many of them studied, or for how long, at the stage 1 or 2 level before registration was required for the first two stages of the NZCE. The same argument applies to the duration figures of one year or more. The information on duration by itself therefore serves little useful purpose.

Table 8 *Duration from registration to withdrawal*

Years	N	%
0	3,956	76.4
1	482	9.3
2	334	6.5
3	228	4.4
4	109	2.1
5	49	0.9
6	14	0.3
7	4	0.1
Total	5,176	100.0
No information	24	

Other information about the students who withdrew from study within a year of their registration may help to explain patterns of dropout or reasons for it. These students, more often than others, lacked formal qualifications, and fewer of them were studying civil engineering. Other student characteristics not investigated in the present research may also have influenced the duration of NZCE study. For example, Offenberger presented some evidence suggesting that married students took an additional year to complete the Certificate course.

Breaks

According to the records only 451 students in the sample (8.7 percent) had broken their study since they registered. The 1974 registration group had over twice the expected number of students with breaks in their certificate study (21.3 percent) but there is no apparent explanation for this. Breaks were more common for the students who were under 21 years when they registered (63.1 percent), and for those who had University Entrance (64.5 percent). A larger proportion of Civil engineering students had breaks in their study programmes (28.9 percent).

Stage reached

How far did the students progress before withdrawing? The record searchers noted the stage at which the student was working when he or she dropped out, with the results shown in Table 9.

Table 9 *Stage reached at year of dropout*

Stage	N	%
Stage 1 or 2	7*	0.1
Stage 3	3,938	76.1
Stage 4	788	15.2
Stage 5	442	8.6
Total	5,175	100.0
No information	25	

* See explanatory comments in the text about the interpretation of this table.

Most were working at stage 3 when they discontinued. The figures show that only 7 students in the sample had not reached stage 3 at the time they withdrew. Theoretically, for those registered from 1973 to 1979, dropout would not have appeared on AAVA records before stage 3 simply because none registered before that stage. This was not the case for 1980 registrations. Given the inflated number of registrations for stages 1 and 2 resulting from the change in registration requirements outlined above, it is highly unlikely that the number who dropped out before reaching stage 3 would be as small as 7. Fifty-five percent, or 587, of the dropouts registered in 1980 had University Entrance or a higher qualification which might have made them eligible for exemptions from the first two stages and even allowed them to attempt subjects of the third stage in the same academic year. Some of the 1980 group could possibly have gained some exemptions for stage 1 or 2 subjects as a result of school or trade qualifications and have been trailing[4] other subjects while working at stage 3. Others might have completed or partially completed their first two stages in unregistered study before 1980. But even a generous allowance for these possibilities would not account for such a low number of dropouts at the stage 1 and 2 level as the 7 reported in Table 9. Misinterpretation of the records resulting in some miscoding seems a more likely explanation.

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[4] Trailing is discussed more fully on page 45.

While the exceptional circumstances in 1980 inflated the overall proportion of the sample who dropped out at stage 3 (76 percent), it is interesting to note that this proportion did not fall below 64 percent for any of the registration years from 1973 to 1979.

What characteristics, if any, distinguished the dropouts who reached the later stages? More of those who dropped out from stages 4 and 5 had University Entrance (67-68 percent). Those who reached stage 5 were more likely to be studying Civil (30 percent) and less likely, Telecommunications (17 percent). Whereas the stage 3 dropouts included the expected proportions from the Mechanical, Electrical and Telecommunications options, fewer than expected dropped out from Civil at stage 3 (20 percent). The students who reached stage 5 before dropping out were three-and-a-half times more likely to have had a break in their study.

Exemptions

The stage of study reached before dropout would have been determined also by the exemptions granted. Students could claim exemptions from subjects of the first three stages, except English (later Communication English), if they had already gained examination passes in those subjects at an equivalent or higher level. Because the first two stages of the 5-stage Certificate course relate closely to 5th and 6th form secondary school standards, students with passes in appropriate School Certificate, 6th Form Certificate and University Entrance subjects could gain exemptions. Others, holders of certain overseas qualifications for example, and students who had completed certain Technicians Certificates or gained university stage 1 passes, could be exempted from stage 3 subjects. So we cannot assume that a student who dropped out from stage 5 had persisted longer in course work than someone who withdrew at stage 3. He or she may have entered the course at a later stage by virtue of exemptions gained from, say, University Entrance. It is the exemption policy as much as the ability, persistence or other circumstances of students that explains why those with higher entry qualifications did not drop out until after stage 3.

There are detailed conditions covering exemptions which will not be discussed here.[5] In any case no accurate figures on exemptions could be assessed from the record data, as exemptions were seldom recorded on the registration cards. No exemptions were shown for 81 percent of the cases despite the obvious number whose school or other qualifications would have made them eligible.

Completion of stage 1 and 2

Just one-third (33.3 percent) of the students had completed the first two stages before withdrawing from their courses. More of those who completed had University Entrance (63 percent) and the exemptions they claimed as a result of this qualification could have contributed significantly to their completion of the early stages. There tended to be more Telecommunications students (26 percent) and fewer Electrical students (21 percent) than one would expect by chance among the group who had completed stages 1 and 2. An analysis for the whole sample showed no relationship between age and completion, but when 1980 registrations were excluded an age association did appear.[6] The group who completed the first two stages before dropping out included an unexpectedly high proportion (10.1 percent) of students who were over 30 years old when they registered. Presumably this association was masked by the disproportionately high number of younger students in the 1980 group.

Understandably, the proportion who completed stage 1 and 2 reflected the date of registration too: more came from the earlier registrations who had more years in which to complete. A further significant finding is that those who completed stage 1 and 2 were almost twice as likely to have had a break in their study. Thus breaks in study seemed to enhance rather than inhibit performance, at least in the early stages of the selected technician courses.

The proportion of students who had not completed the first two stages (66.7 percent) would have been somewhat inflated by the inclusion of stage 1 and 2 registrations for the first time in 1980.

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[5] The interested reader should refer to the annual AAVA handbooks.

[6] In each case an analysis excluding the students registered in 1980 was carried out as well as the analysis for all students in the sample. The results reported are based on the whole sample analysis except where exclusion of the 1980 registrations changed those results, as it did here.

Trailing subjects

A high proportion (77.6 percent) of those who dropped out at stage 3 had not completed stages 1 and 2. The policy of the Technicians Certification Authority, later AAVA, allowed students to trail certain subjects from the first two stages into the third. To understand the concept of trailing it is necessary to know a little about the structure of courses for the New Zealand Certificate in Engineering during the period under study. The subjects of the first two stages formed a common core for all the options, with two exceptions : one first level subject (chemistry) was not required in the Telecommunications option, and one second level subject (physics) was not compulsory for the new Civil option introduced in 1980. At the third stage a system of prerequisites governed the student's progress. A subject could not be presented for examination at stage 3 unless the stipulated prerequisite had been passed or exempted. Second level mathematics, for example, was a prerequisite for mathematics at stage 3 for each of the four engineering options represented in the research. Mechanics I and drawing I were prerequisites for subjects at stage 3 in the Civil and Mechanical options; physics II was another in the Mechanical, Electrical and Telecommunications options.

Under this system it was possible for a candidate to be examined in a stage 3 subject when he or she had up to three subjects of stages 1 and 2 still to pass, or to present stage 1 and 2 subjects for examination at the same time as stage 3 subjects. The information from the records on the number who were working at the third stage without having completed the first two stages (77.6 percent) indicates that the practice of trailing subjects in this way was widespread, at least among the students who eventually dropped out.

The first annual report of the Technicians Certification Authority had this to say about the practice of trailing subjects:

> Any organisation that has to conduct examinations is obliged to make decisions about pass requirements. Where the subjects are divided into successive groups, with those in the earlier groups pre-requisite to or more elementary than those that come later, the question inevitably arises whether the student may proceed to the later stages before he has completed all that goes before.... Students are ambitious and intensely sanguine. All wish to push on with a further stage if permitted to do so, regardless of the fact that they are still trailing subjects behind them; that is, they have not passed all subjects of the years below the stage they wish to attack. Their intolerance of delay is understandable if they lack only one subject, which they may have attempted

> unsuccessfully, and are required to spend a whole year on it before pushing ahead. On the other hand, subjects trailed into a year when perhaps three externally examined subjects must be taken can be a real handicap and the student may be little better off at the end of the year than if he had concentrated on one subject.
> (Technicians Certification Authority, 1961, pp.8-9)

In the present study, if the students who withdrew after gaining the Intermediate Certificate (see next section) by successfully completing the first three stages before dropout are excluded from the analysis, then the figures for the number of students trailing subjects are even more striking. Seventy-eight percent who withdrew at stage 3 without the Intermediate Certificate had not completed stages 1 and 2; 50 percent of the stage 4 dropouts without the Intermediate Certificate had not completed the first two stages; nor had 36 percent of the comparable stage 5 dropouts.

One possible interpretation of these findings is that students who were trailing subjects became overburdened with study and tended to drop out because of this. Study overload as a reason for dropout is discussed in Chapter 9.

Intermediate Certificate

A student who completes the first three stages of the New Zealand Certificate course qualifies for the award of an Intermediate Certificate. This certificate may be the goal for some students, rather than the full certificate. Offenberger (1979, p.12) suggested that the stage 3 examinations, conducted externally, are 'the first major hurdle for students', and some students will reach the ceiling of their achievement with the Intermediate Certificate.

Very few (8.1 percent) in the sample had gained the Intermediate Certificate. Or it might be more correct to say that very few had fulfilled the necessary requirements for the certificate. In the earlier years the certificate was issued automatically but later the award was made only on application.

Proportionately as many women as men completed the Intermediate Certificate before discontinuing their studies. Younger students, particularly those under 19 years at registration, were shown as more likely to have gained the Intermediate Certificate, but it seems that this association was reflecting the disproportionate number of young people in the 1980 registration group. When the 1980 group was excluded from the analysis the association between age and achievement of the Intermediate Certificate disappeared. As might be expected, there was a relationship with entry qualifications: only a low proportion of the students with no school qualifications (1.6 percent) or with School Certificate as their highest level (5.3 percent) gained the Intermediate Certificate, compared with a high proportion of ex-university students (16.9 percent). Once again the last named were probably the ones who stood to benefit most from exemptions and therefore to have a better opportunity of completing the Intermediate Certificate level.

Among the options, Telecommunications had the highest proportion of students with Intermediate Certificates when they stopped study, and Mechanical had the lowest (Table 10). Despite these differences (they would have occurred by chance only once in a hundred times), the relationship between completion of Intermediate and the option studied was not very strong. From the 1973 to the 1980 registration years there was a steady decline in the proportion of the sample that completed the Intermediate Certificate level, illustrating further the time advantage for those registered earlier. A break in study was related to success in completing the Intermediate Certificate level. It would be interesting to know what brings students back for a second or third attempt at completing an NZCE study course.

Table 10 *Completion of Intermediate Certificate by option (N = 5,182)*

Option	Completed	Not Completed	Total N	Total %
Civil	7.6	92.4	1,100	100.0
Mechanical	6.9	93.1	1,646	100.0
Electrical	8.3	91.7	1,188	100.0
Telecommunications	10.1	89.9	1,248	100.0

χ^2 = 10.56, 3 df, p <.01 differences clearly significant

Passes and failures

Two components, course work and examination results, are considered in assessing a pass for a given subject. The records were searched for information on both the number of passes and the number of failures for each student who dropped out from 1973 to 1980. But 99.7 percent had no failures recorded against their names, and the failures variable was discarded after the preliminary analysis of the record data. Table 11 shows the number of students with recorded passes. Just over half the sample had no passes recorded, and most of these (97.6 percent) were working at stage 3 or below. For the 48.2 percent with recorded passes, the number of passes ranged from 1 to 16.

Table 11 *Number of students with recorded passes*

Number of passes	N	%
None	2,682	51.8
1	759	14.6
2	442	8.5
3	391	7.5
4	258	5.0
5	166	3.2
6	126	2.4
7	109	2.1
More than 7	251	4.9
Total	5,184	100.0
No information	16	

The pass performance of males and females was much the same, both for no passes and for each degree of recorded passes. The students who were younger than 21 years when they registered performed better before withdrawing : a lower proportion of them dropped out without any passes credited (45.2 percent), and they also formed the highest proportion with more than seven passes recorded (6.2 percent). Nearly three-quarters (73.2 percent) of the students with no formal qualifications on entry left NZCE study with no recorded passes, but the proportion dropped to half (52 percent) when 1980 registrations were excluded. Conversely, students who began with University Entrance were the qualification group credited with the most passes (6.4 percent), performing better than entrants with Advanced Trade Certificates or university experience.

An analysis of passes for each registration year showed that the proportion with no passes rose from 29.[illegible] percent in 1973 to 53.7 percent in 1979, and to 78.6 percent in 1980. In other words, the earlier the registration the greater the advantage in years for the student to gain passes. This pattern is consistent with previous analysis showing the expected improvement in performance with the passage of time after registration.

One of the strongest associations found was that between pass performance and breaks in study. Only 4 of the 451 students (0.9 percent) who took a break finally left NZCE studies without a recorded pass. Coming back to study after a break may denote a keener level of persistence or motivation. Whatever the underlying dynamics, breaks in study benefited performance before dropout. The students with breaks in their study were three times more likely to gain a high number of passes before dropping out.

The number of passes students gained before dropout varied according to the option they were studying. The greatest differences occurred in the Civil and Electrical options with Civil students being the better performers. The Civil option had the smallest proportion with no passes (45.5 percent) and the largest proportion who achieved over seven passes (9.2 percent). Proportionately more dropped out of the Electrical option with no passes (57.7 percent), and fewer Electrical students reached the level of over seven passes (2.1 percent). The other two options differed most in terms of the proportions who dropped out with three passes : Telecommunications had the largest proportion (10.4 percent) and Mechanical the smallest (6.0 percent).

Achievement before dropout

A further variable, called units, was created by the addition of recorded passes and exemptions for each student in the sample. This variable was calculated to provide a measure of the student's overall performance, or credits obtained, before dropout. But, as we noted earlier, the information available from the records on exemptions was too sparse for valid use. The lack of accuracy on exemptions also invalidated the data on units and, for this reason, no analyses based on units were carried out.

The achievement at dropout for each option is summarized in Table 12 which combines results, discussed earlier, for three measures.

Table 12 *Achievement at dropout by option*

Option	Nil passes recorded N	Nil passes recorded %	Completed Stage 1 and 2 N	Completed Stage 1 and 2 %	Completed Intermediate N	Completed Intermediate %
Civil	500	45.5	390	35.5	83	7.6
Mechanical	849	51.6	527	32.1	113	6.9
Electrical	685	57.7	356	30.0	99	8.3
Telecommunications	647	51.8	449	36.0	126	10.1
Total	2,681	51.7	1,722	33.3	421	8.1

Summary

The major findings from the analysis of AAVA records on the progress and achievement of 5,200 NZCE students before dropout are summarized as follows:

1. Mechanical dropouts were the largest group (32 percent) and held a relatively stable majority throughout the survey period (Figure 9). Civil dropouts formed the smallest group overall (21 percent) and were noticeably so in the later years.
2. There were differences between the options associated with entry qualifications, sex and age. Higher proportions of younger and female dropouts were studying Civil engineering, while Mechanical dropouts tended to have lower school qualifications at entry.
3. Three-quarters of the students in the sample dropped out within their first year of *registered* study, before completing stage 3. Many of them appeared to be trailing subjects : 78 percent who left at stage 3 without the Intermediate qualification had not completed the first two stages. (Note : from 1973 to 1979 students had to register for NZCE study when they began stage 3; in 1980 registration was required from stage 1).
4. A third of the sample completed the first two stages of the NZCE course, but only 8 percent completed the Intermediate Certificate level before dropping out (Figure 10). Those who qualified for the Intermediate Certificate were more likely to be younger when they registered, better academically qualified at entry, and studying Telecommunications. More of them had broken their study course. The group of Mechanical dropouts

Figure 9
Dropout Proportions by Option

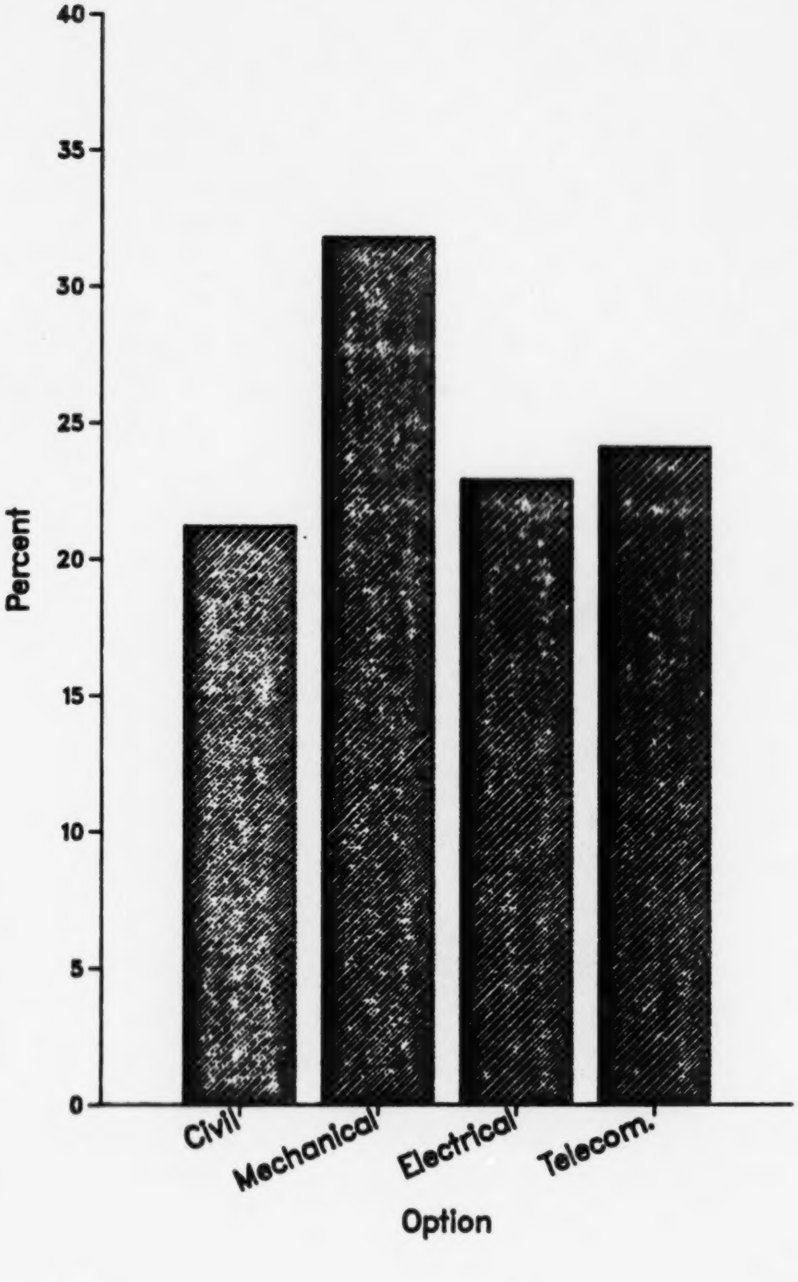
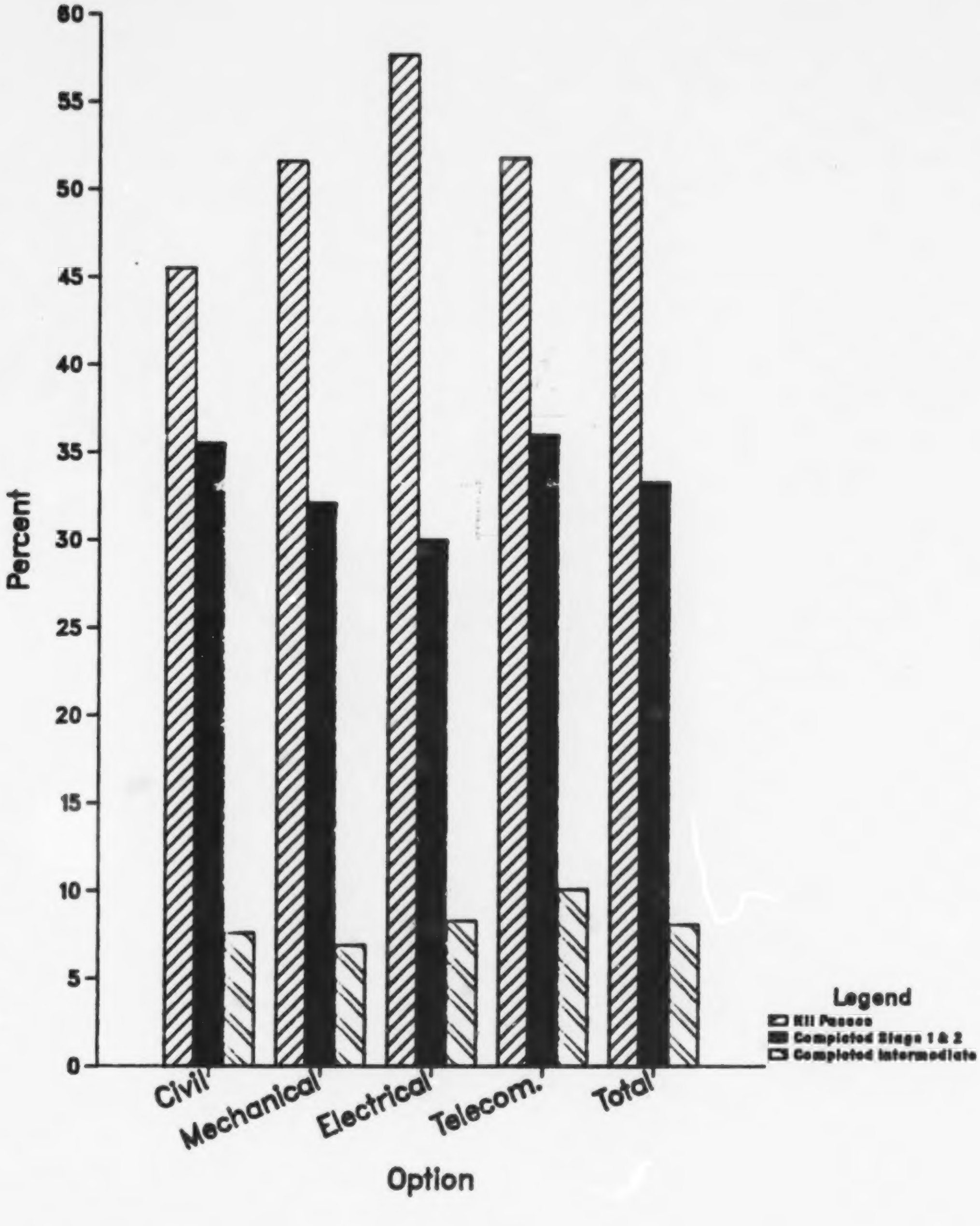


Figure 10

Achievement at Dropout by Option



did the least well if the Intermediate Certificate is used as a measure.

5. Reaching a level beyond stage 3 was associated with having better school qualifications, studying Civil engineering, and taking a break in study.
6. Just over half the sample left their studies without achieving any passes. The groups with the most passes were the youngest students, those with University Entrance, and those in the Civil option. The students who took a break had a better pass record.
7. The important impact of exemptions on student progress and achievement was noted, but details on the number of exemptions granted to the sample students were generally not recorded.

5 What The Records Show

First, the student records tell us something about the nature and adequacy of the records themselves. Then, by describing some of the characteristics and study details of a large number of students, they allow us to identify patterns, possible relationships and tentative explanations which can be explored in a more intensive study of dropout. They also help to isolate what is not known about reasons for dropout from these engineering courses. Finally, the records provide information against which we can reconsider the definition of a dropout. These four aspects are discussed in turn.

The records

The record cards, which provided the raw data for the first stage of the study, recorded only limited information about students, their courses and their progress. From 1973 to 1980 these cards were maintained initially by the Technicians Certification Authority and then, from 1980, by AAVA. Both authorities attempted to compile national records of students at institutions throughout the country, and for this task they relied on the information supplied by those teaching institutions. The delay that resulted in the collection of data for the present research, when it was discovered that some student cards bore only a name and teaching institution, were described in Chapter 2. Analysis of the record data revealed other significant gaps. Basic demographic information such as the student's sex was sometimes missing as were details on entry qualifications. Key information on the exemptions granted a student was sparsely recorded; other information (e.g., entry qualifications, duration of study) was not always precise, or was too inconsistent with other known facts to be regarded as entirely valid (e.g. stage of study at time of dropout).

The fragmentary nature of some of the information is understandable. It came from 23 institutions throughout New Zealand and reflected a complex provision of courses which could be entered at various levels and undertaken in different ways, for example, by full- or part-time study, by correspondence, or through block courses. Record keeping had to pick up, as well, the variety introduced by students after their initial registration : students who switched from one institution to another with changes of job, work pattern or location; students who dropped a course in one year to take it up in another; and students who changed course option. Given such an array of potential sources of change and variation it would be surprising if the records had carried full and up-to-date information on all students.

It was AAVA's plan to computerize all student records, including the pre-1982 card registrations, by the end of 1984 (Imrie, 1984). The Authority has also introduced procedures to rationalize reporting and recording of coursework. Information should therefore be more easily recorded and more readily accessible in future. Data retrieval for research purposes should certainly be easier and more accurate than the hands-on card-checking methods used in this study. Nevertheless, the information held can only be as complete as the sources from which it is derived. For this reason the information links between the teaching institutions and AAVA are crucial.

The gaps restricted what information could be gleaned from the records about students and their patterns of dropout. A further complication arose in how to interpret the information from the records. A regulation was introduced in 1980, changing the point of required registration from stage 3 to stage 1 of the certificate courses. The resulting change in the coverage of the records for 1980 meant a loss of comparability between the information for that year and the earlier seven registration years under investigation. With its once-only catch-up of previously unregistered stage 1 and 2 students, 1980 became an exceptional year for which record data were possibly distorted. It is not clear whether or not this consequence was foreseen when it was decided to canvass the 1973 - 80 period of registration for the main sample of dropouts and the questionnaire sub-sample.

The students who dropped out

The students who dropped out before completing their NZCE courses shared some of the characteristics of all students who undertake such courses. They were, for example, predominantly male and generally better qualified than the typical school leaver. Indeed, if University Entrance were to be used as a measure, the combined findings from this, and Offenberger's, research suggest that it could be hard to predict which students would drop out and which ones would continue to become successful certificate holders.

The chances of dropping out were highest for the students studying the Mechanical option and lowest for the Civil students. There seems to be no simple explanation for this pattern. While studying Mechanical was associated with a lack of, or lower, school qualifications, that option also had a sizeable proportion of students who began their certificate studies with an advanced trade qualification. The Mechanical option contained a heavier weighting of men than the other three options and a majority of younger students, although not as high a proportion of under-21-year-olds as the Civil option. It may be that the higher proportion of dropouts in Mechanical was reflecting the combined influence of the sex, age and qualifications variables, or possibly their interaction with other unknown influences.

Another interesting feature of the dropout pattern for Mechanical students compared with others was that the proportion of Mechanical dropouts, about a third of the sample, remained fairly stable from 1973 to 1980. This was not so for the other options. The proportion dropping out from Civil declined substantially in 1979 and 1980, and the proportions fluctuated for both the Electrical and Telecommunications options. Course revision is one possible influence on the pattern of dropout. A completely revised course for NZCE (Civil) was introduced at stages 1 to 3 in 1980, but this change would not account for the lower proportion of Civil dropouts in 1979.

The bulk of students in the sample, that is, those who registered between 1973 and 1979, were not required to register with the controlling authority until they reached the third stage. About two-thirds of them were working at stage 3 when they withdrew from their studies, but fewer than a quarter of these students had completed the first two stages and were presumably trailing subjects. For over half the sample no passes were recorded before withdrawal.

The records show quite clearly that, in general, dropout was not related to completion of the Intermediate Certificate at the end of stage 3 studies. While the Intermediate may have been the goal for some, very few students in the sample reached it before they dropped out. Those who did gain their Intermediate Certificate were more often studying Telecommunications. This finding raises the possibility that some students may have been using the certificate course as a springboard for other jobs or courses. It would be interesting to know, for instance, how many of the Telecommunications students were aiming at an Intermediate Certificate which would give them entry to a degree course. A more likely explanation, however, may lie in the level of support provided by the employer (Imrie, 1985). Telecommunications students tend to be employed by the Broadcasting Corporation or the Post Office, employers with well-organized training schemes. The superior achievement of the Telecommunications students could well be reflecting this organization: employers encouraging young people to take up NZCE study and making sure they enrol at the institute, register with AAVA, apply to enter examinations, and so on. Others may not get the same organized training or general supervision of their educational studies. Students in the Mechanical option, for example, would come from a wider variety of employment, including many small companies.

Both the stage reached and achievement before dropout, as measured by the number of recorded passes, varied according to the option studied. Fewer students studying Civil stopped at stage 3 and more of them reached stage 5. Civil students also gained more passes before dropping out. Well over half of those who ended their courses without any passes were studying the Electrical option.

A student's progress and achievement before dropout were determined largely by the point at which he or she entered the certificate course. The entry point in turn, depended on entry qualifications and the exemptions related to them. Unfortunately the records gave little or no information on exemptions, and it is therefore hard to account for the variations noted. It is not known, for example, how many of the Telecommunications students who were successful in gaining their Intermediate Certificates had previously completed a Technicians Certificate exempting them from some parts of the NZCE course. Nor can we say whether the higher proportion of dropout from Mechanical, or the better progress and attainment of Civil students, is related to the number of exemptions granted students in these options. But

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there was a clear relationship between entry qualifications and the stage reached. Those who dropped out within a year of registering were not as well qualified at entry. Those who reached stages 4 or 5 had higher school qualifications at entry. These findings suggest that dropout, as well as progress before dropout, was related to the number of credit passes or exemptions granted on the basis of qualifications. It is therefore pertinent to ask: to what extent might a student with lower qualifications on entry, and few exemptions as a consequence, feel daunted by the mass of work and years of study ahead and be more inclined to drop out?

The findings on what part age played in progress and achievement before dropout were not clear cut. The older students registered between 1973 and 1979 tended to do slightly better in completing stages 1 and 2; the younger students were less likely to drop out without any passes. The younger students could have benefited from their longer time at school, gaining a sounder background for study. The older students could have reached a level of personal development where they were ready to settle down to serious study. That is to say, differences in achievement in the NZCE course may be accounted for both by academic background and by personal development or commitment to study.

Continuity of study is another potential source of variation, especially for students studying part-time over a long term concurrently with their work. Very few students in the dropout sample had broken their study programmes. But those whose record cards showed such a break were more likely to have progressed further and to have achieved better before stopping. There were more students with breaks among the smallest dropout group - those studying Civil.

Profile of a dropout student

The profile that emerges from the records of a large number of students who dropped out from four NZCE options is not very sharply defined. Typically the dropout student was a young male who registered for his selected option with more than the minimum qualifications to succeed in the course. But he generally left within a year of registering at the third stage, often before completing the first two stages or gaining passes in any subjects. We don't know how many subjects he was exempted from or how long and what level he was studying before he registered. The odds are greater that he was studying the Mechanical option but it is not known whether his study was full-time, part-time, in a block course, by correspondence, or what mixture of these tuition modes he experienced.

The atypical student, however, may have persisted long enough, or been better placed, to gain an Intermediate Certificate, particularly if the award was in Telecommunications. He may even have been among the 442 students who reached the final stage before dropping out, in which case it is probable that his entry qualifications were higher, and that he was studying Civil and had taken a break from study at some time. Why he should drop out at such a late stage in the Certificate course remains a puzzle.

Reasons for dropout

Although some of the students who dropped out early may have been merely sampling various options, or marking time while sorting out future vocations, others could have been deterred by lack of exemptions. The relationship of dropout to the operation of the Authority's exemption policy is one useful area for further study. Evidence that trailed subjects might have contributed to study overload and hence precipitated dropout in many cases suggests another aspect that deserves closer investigation. We need to know also whether dropout is related to the student's geographical location or teaching institution.

The reasons for dropout in some cases are undoubtedly complex and varied. They may lie not so much in the nature of the course as in other areas not directly related to the course, for example, in conflicts between job and study, in personal attitudes or in competing family demands. Information on these aspects and the way they combined to affect individual students who dropped out is rarely available from student records. The questionnaire reported in the next chapter sought to fill some of the gaps left by the records and to explore some of these more complex aspects and their interplay.

Defining a dropout

The record information highlights the problem of defining a dropout in the context of prolonged courses designed primarily for part-time concurrent study. Certainly the bulk of students in the sample withdrew at an early stage of their registered study and most of these could well have been definite cases of permanent dropout. But the information also indicates that over a fifth of the students were still active in study, albeit unsuccessfully, for periods ranging from one to seven years after registration. It would be easy to classify students prematurely as dropouts using a criterion based on the minimum, or even modal, number of years required for completion of study. Similarly, it is possible to obtain only a gross reckoning of the dropout rate by comparing the number of new registrations with the number of certificates issued in the minimum study time after registration. The records also showed that a small proportion of students come back to NZCE study after a break. In using the term 'dropout' it is worth bearing in mind that today's 'dropout' may in practice complete his or her certificate in the next few years.

For a better understanding of what the term dropout means in the context of technician education we need more precise information on patterns of study for the students who withdrew : How long on average did they spend studying? Did they break their study and, if so, at what stage and for how long? How many saw themselves as dropouts? For insights on the meaning of dropout and the reasons for it we turn now to the results of the questionnaire study.

6 The Students Who Were Questioned

It was hoped that the questionnaire survey would give insights into the complex factors which lay behind student decisions to give up their NZCE studies. The questions were designed to tap attitudes, opinions and experiences in addition to factual information obtained from the AAVA records in the first stage of the study.

Many of the questionnaire responses proved to be illuminating and informative but the number of questionnaires returned was frustratingly small. The low response rate - 35 percent, at worst, 63 percent at best - means it is difficult to make valid generalizations. Nevertheless it was decided to report the results as a lead for further investigation and as tentative information for administrators and policy-makers.

A further limitation resulted from the loss of records containing identifying information for questionnaire respondents. This meant that the data from their questionnaires could not be matched with data taken from the AAVA records : a useful source of checking and comparison was thus lost and other information was restricted. For example, as details on sex and date of birth were not sought again on the questionnaire there was no way of being sure how many, or which, respondents were male or female, although some females could be identified from their comments. As a result the experiences and views of female dropouts could not be adequately investigated despite the care which had been taken to draw a sample which allowed this.

The people who responded

As it turned out, not all who completed questionnaires were dropouts from NZCE study. This is hardly surprising given the three potential sources of variation : the record cards from which the dropouts were identified, the multiplicity of sources from which the recorded data were obtained and the propensity of human beings to make changes.

Of the 168 returned questionnaires only 97 proved to be from people who met the dropout criteria accepted for this survey, namely, no evidence of study for the preceding three years. Of the remaining 71 questionnaires, 11 were from people who had completed NZCE, and 30 were from continuing students; another 30, it was decided, should not be included in further analysis because they were from students who had ceased study in 1981, or later, and could not therefore meet acceptable dropout criteria.

Thus, of 168 former students who from the AAVA records appeared to be dropouts, just under a quarter (24.4 percent) had continued their studies (6.5 percent to completion, 17.9 percent still active) and a little under one-fifth (17.9 percent) were judged too recently discontinued to be dubbed dropouts. That left a little more than one-half (57.7 percent) to be considered dropouts. It is this group which provided most of the data for the following analyses.

The questionnaire sample

School qualifications

Respondents were asked to nominate all the school qualifications they held from the listed categories rather than the highest level only. Likewise the analysis was not confined to the highest qualification level, making direct comparison with the record data difficult. Nevertheless the questionnaire dropout group was probably representative of the main sample in terms of school qualifications, both groups having 56 percent with University Entrance (see Table 13). Three-quarters of the sample had more than three School Certificate subjects.

Table 13 *Proportions of questionnaire respondents with each school qualification (N = 97)*

Qualification	N	%
School Certificate in more than 3 subjects	72	74.2
Endorsed School Certificate	16	16.5
6th Form Certificate	55	56.7
University Entrance	55	56.7
Higher School Certificate	15	15.5
Bursary or Scholarship	8	8.2

It is interesting to compare the qualifications of the questionnaire dropout group with those of the 30 students who were excluded from the main analysis because they were still continuing their studies. In percentage terms those who continued study appeared marginally better qualified except at the bursary/scholarship level where the balance tipped slightly in favour of the dropouts. However, reasons for dropping out do not appear, on this evidence, to lie in differences in qualifications between the two groups.

Post-school qualifications

Only four percent of the questionnaire dropout group had some university credits on entry qualifying them for NZCE exemptions. On the other hand 23 percent had completed Technicians Certificates before undertaking NZCE. The Technicians Certificate, a three-year qualification, also controlled by the Authority for Advanced Vocational Awards, is a lower level qualification than the New Zealand Certificate and with a more practical emphasis. There is a good deal of overlap between the subjects of Technicians Certificates and New Zealand Certificates in the first two years. This means that most of the students in the questionnaire sample with a Technicians Certificate would have been exempt from all of the subjects of the first two stages of their NZCE courses and, depending on the particular Technicians Certificate held,[7] some stage 3 subjects also. Stage 3 exemptions were available for subjects in the Telecommunications, Electrical and Civil NZCE options, but not for subjects in the Mechanical option, as there was no relevant Technicians Certificate in mechanical engineering from which exemptions could be generated. Thirteen students earned stage 3 Telecommunications exemptions in this way, six, Electrical and one, Civil; one did not qualify and one had an overseas qualification for which eligibility for exemption was not evident. It is not known how many of the students in the questionnaire sample had an Advanced Trade Certificate on entry to the NZCE course.

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[7] See Technicians Certification Authority, *Handbook* 1979, p.13, for details of exemptions.

Option

In terms of the option studied, the sample of questionnaire respondents was not as closely representative of the record population as was planned (Table 14). Nevertheless, the differences in the distribution of students among options for the two samples were not large enough to make the questionnaire sample unrepresentative.

Table 14 *Record and questionnaire samples: number of students in each option*

Option	Record sample		Questionnaire sample	
	N	%	N	%
Civil	1,100	21.2	25	25.8
Mechanical	1,647	31.8	25	25.8
Electrical	1,188	22.9	24	24.7
Telecommunications	1,248	24.1	23	23.7
Total	5,183	100.0	97	100.0
No information	17			

Where the students lived

The majority of respondents lived in the six main cities while they were studying : Auckland, Hamilton, Palmerston North, Wellington, Christchurch and Dunedin. Table 15 shows location according to option. It will be noticed that more Mechanical and Electrical students, than students in the other two options, did the bulk of their study while living in large cities. For all four options, the combination of 'large city' and 'other urban' (more than 20,000 people) locations, accounted for 85.6 percent of the students. More

Civil (20 percent) and Mechanical (16 percent) students, than Electrical and Telecommunications, lived in medium towns (5,000 - 9,999), small town (1,000 - 4,999) and rural (fewer than 1,000). No obvious rural or remote factors emerge to explain dropout decisions.

Table 15 *Location of questionnaire respondents while studying, by option (N = 97)*

Option	Large city %	Other urban %	Large town %	Medium town %	Small town %	Rural %	%
Civil	64.0	12.0	4.0	4.0	8.0	8.0	
Mechanical	80.0	4.0	0.0	4.0	4.0	8.0	
Electrical	79.2	12.5	0.0	0.0	4.2	4.2	
Telecommunications	52.2	39.1	0.0	4.3	0.0	4.3	
Total N	67	16	1	3	4	6	
%	69.1	16.5	1.0	3.1	4.1	6.2	100.0

NZCE study

Modes of study

A range of information was sought from students about their modes of attendance or study : whether they were full-time students during their first year of study; by what methods they received tuition for NZCE (yes/no to ten stated possibilities); and what main method of tuition they experienced (one to be selected from a list). 'Study' and 'tuition' were used synonymously in these questions.

Table 16 shows the main mode of study experienced by respondents and the numbers who experienced each mode at some time ('all modes'). On average, students sampled just under two modes of study. Around half studied by correspondence at some stage, a little under half had periods of part-time day release and over half had experience of part-time study in the evenings. One-fifth were full-time students during their first year of study.

Table 16 *Questionnaire respondents who experienced each mode, and each main mode, of study (N = 97)*

Mode	All modes % of sample	Main mode % of sample
Full-time	19.6	15.7
Part-time day	44.3	24.0
Part-time evening	55.7	19.8
Correspondence/TCI	48.5	29.2
Short block	10.3	1.0
Long block	2.1	1.0
Sandwich	5.2	1.0
Part-time day/part-time evening	0.0	7.3
Full-time/part-time day	0.0	1.0
Other	2.1	0.0
Total		100.0

Note: No information on 1 student under main mode.

Concurrent study in various forms - part-time day, part-time evening, a combination of part-time day and part-time evening, and correspondence study - accounted for 79.5 percent of that given as 'main mode'. Only three percent cited block and sandwich courses as their main method. It was to be expected that concurrent study would dominate since work experience is a required complement of NZCE study, award of the final certificate being dependent on the completion of three years suitable work experience. Full-time study was the main method for about one-sixth of the sample.

Face-to-face tuition - all forms of study except correspondence - predominated for Civil (88 percent), Mechanical (83 percent) and Electrical (67 percent) students (see Table 17). For Telecommunications students, on the other hand, correspondence was the main mode of study for 57 percent of students. The presumption is that Telecommunications students, fewer of whom lived in large cities, were more often forced to opt for correspondence study.

The majority of Civil students studied by day : 18 out of 25 (6 full-time, 10 part-time, 1 short block, 1 sandwich). By contrast, only 4 out of 24 Telecommunications students studied mainly by day. Eleven Mechanical (3 full-time; 8 day release) and 7 Electrical students (5 full-time; 2 day release) were day time students. The majority of Electrical students studied either in the evenings or by correspondence : 16 altogether, 8 by each of these two modes.

Table 17 *Main mode of tuition in four options (N = 97)*

Mode of tuition	Civil %	Mechanical %	Electrical %	Telecommunications %
Full-time	24.0	12.5	20.8	4.4
Part-time day	40.0	33.3	8.4	13.0
TCI (correspondence)	12.0	16.7	33.3	56.5
Part-time evening	8.0	25.0	33.3	13.0
Long block	0.0	0.0	0.0	4.4
Short block	4.0	0.0	0.0	0.0
Sandwich	4.0	0.0	0.0	0.0
Full-time/part-time day	0.0	4.2	0.0	0.0
Part-time day/part-time evening	8.0	8.3	4.2	8.7
Total	100.0	100.0	100.0	100.0

Note: No information on 1 Mechanical student.

Hence mode of study tended to vary with the option studied as shown by several patterns : correspondence study for Telecommunications students; the experiences of Civil and Mechanical students in part-time day release study, the experiences of Electrical students in both correspondence study and in part-time evening study. Whether these tentative associations have any significance for explaining dropout may become clearer when students' comments are considered in later discussion.

Duration of study

Questionnaire respondents were asked : *In what year did you first enrol for NZCE study?* and *In which year did you cease study for NZCE?* From the information obtained, the duration of study for each student was calculated by subtracting the year of first enrolment for NZCE study in a teaching institution from the final year of study. Duration of study, by this formula, was a relatively gross measure since it took no account of breaks in study. The resulting numbers are shown in Table 18.

The method of calculation had another weakness : those students who withdrew after successfully completing the work of the year of their withdrawal were credited with having studied for one year less than in fact they had. Thus the student who enrolled and withdrew in the same year after completing it successfully would be credited with no years of study. The number to whom this applied could not be established.

According to the formula used, the mean duration of study was 2.2 years. The mean, assuming that everybody completed the study requirements of his or her year of withdrawal, was 3.1 years. Thus the true mean of duration from enrolment to dropout lay somewhere between 2.2 and 3.1 years.

Table 18 *Duration of study from enrolment to withdrawal (N = 97)*

Years	N	%
0	23	24.7
1	20	21.5
2	19	20.4
3	13	14.0
4	8	8.6
5	2	2.1
6	4	4.3
7	1	1.1
8	1	1.1
9	1	1.1
10	0	0.0
11	1	1.1
Total	93	100.0
No information	4	

For the record sample, duration of study was calculated by subtracting year of *registration* with the Authority for Advanced Vocational Awards from final year of study. But, as explained earlier, registration from 1973 to 1979 occurred at stage 3 and was not synonymous with enrolment in a teaching institution at stage 1 of NZCE study. Therefore duration of study has a different meaning for the two samples and a valid comparison between them is not possible.

The questionnaire sample included 11.8 percent who enrolled before 1973. The inclusion of this group in the sample illustrates the problem of comparing questionnaire data with record data. These pre-1973 students presumably registered with AAVA when they reached stage 3 in 1973 or later, but on the questionnaire showed up as pre-1973 students because it was their year of enrolment which was asked for.

Breaks in study were recorded by only eight students - 8.2 percent, a proportion similar to that of the record sample. Five of the eight had completed Intermediate Certificate, two had been studying at stages 1 and 2 when they dropped out, one had reached stage 4 (no Intermediate Certificate recorded) and one had gone as far as stage 5. Breaks in study did not seem to impede achievement since these eight students, as a group, reached a higher mean level of achievement before dropout than the questionnaire sample overall : 75 percent (six students) reached Intermediate Certificate or higher as against 44 percent. Although the numbers are small they confirm the positive relationship between breaks and achievement that appeared in the analysis of the record data.

Exemptions

When asked about the number of subject exemptions they had when they began NZCE study, 38 percent of students couldn't remember, four percent said they had none, three percent did not respond and 55 percent reported having between one and ten exemptions. Both mean and median for subject exemptions was 4. The figures for exemptions can be taken as little more than suggestive since accurate recall, in some cases years later, could be doubtful.

Level reached

Responses to the question, *What was the highest stage you reached before withdrawing from your NZCE studies?* showed that over half were working at stage 3 when they dropped out. A further quarter (24.8 percent) were working at stages 4 and 5 (see Table 19). There was no significant association between the stage reached and the option studied.

Table 19 *Stage reached at dropout, by option (N = 97)*

Option	Stage 1 & 2		Stage 3		Stage 4		Stage 5	
	N	%	N	%	N	%	N	%
Civil	4	4.1	16	16.5	4	4.1	1	1.0
Mechanical	7	7.2	9	9.3	7	7.2	2	2.1
Electrical	6	6.2	13	13.4	2	2.1	3	3.1
Telecommunications	3	3.1	15	15.4	3	3.1	2	2.1
Total	20	20.6	53	54.6	16	16.5	8	8.3

Because the question did not ask for stage completed it cannot be assumed that students had completed the work of the year in which they withdrew. No doubt some had, but all that can be said with confidence is that students had at least enrolled in a course at the level stated.

A comparison between the questionnaire dropout group and the record sample shows that only 7 of the record sample were working at stages 1 and 2 whereas in the questionnaire group there were 20 (20.6 percent). Theoretically this inconsistency could not arise as the questionnaire sample was drawn from the main dropout population. On the assumption that the questionnaire respondents knew what stage they had reached, the explanation suggested earlier, that some miscoding or misinterpretation of the records occurred, seems inescapable. The most likely explanation is that the 1980 first time stage 1 and 2 registrations were mistakenly thought, by those searching the records, to be stage 3 registrations as there had been no stage 1 or 2 registrations in previous years.

Intermediate Certificate. Nineteen students (20 percent) withdrew after completing an Intermediate Certificate. Numbers and percentages for each option are shown in Table 20. Only 8 percent of the record sample, from which the questionnaire sample was drawn, had completed requirements for an Intermediate Certificate. While this may indicate a possible bias in the questionnaire sample there is also the possibility that the records did not show all of those who had gained an Intermediate Certificate.

Table 20 *Proportions qualifying for Intermediate Certificate, by option*

Option	Questionnaire sample		Record sample	
	N	%	N	%
Civil	6	31.6	83	19.7
Mechanical	4	21.0	113	26.9
Electrical	3	15.8	99	23.5
Telecommunications	6	31.6	126	29.9
Total	19	100.0	421	100.0

It will be noted from Table 20 that the proportions of those in each option with Intermediate Certificate differed between the questionnaire sample and the record sample. The Telecommunications proportions were similar but the others differed markedly. Again, whether this indicates sample bias or gaps in the records is not clear.

Changes of option

A change of option occurred in only five instances among the students questioned. Two Telecommunications students switched to computer studies, and one Electrical student to an Electrical Technicians Certificate ('shorter and more easily obtainable'). It was not known what the other two - one Civil and one Telecommunications - changed to.

Summary

This chapter presents information on the characteristics and progress of 97 students in the questionnaire sample. The information is necessarily tentative because of the low response rate, the loss of identifying information, and the reduction of the sample after non-dropouts were eliminated.

Questionnaire and record samples seemed comparable in terms of school qualifications but differences in the information requested on post-school entry qualifications prevented direct comparisons between the samples for trade or lower level technician qualifications.

Questionnaire respondents were almost evenly spread among the four NZCE options, making the sample somewhat less representative than was planned in this respect.

There was no apparent association between dropping out and geographical location. Over two-thirds of respondents lived in the six main centres : 80 percent of the Mechanical students, 79 percent of Electrical, 64 percent of Civil and 52 percent of Telecommunications. Telecommunications students were the largest proportion (39 percent) located in other cities with a population of over 20,000. Towns and rural areas had more Civil (20 percent) and Mechanical (16 percent) than other options.

For 80 percent of students concurrent part-time study of some kind was the norm. The forms of study experienced were : correspondence (29 percent), part-time day (24 percent), part-time evening (20 percent), part-time day and evening (7 percent), full-time (16 percent), block/sandwich (3 percent). Nearly two-thirds (64 percent) of the students in the questionnaire sample experienced at least two different forms of study.

Some tentative associations between dropout and mode of study within options were suggested for further investigation.

For the questionnaire sample the mean duration from enrolment at stage 1 to dropout was between 2.2 and 3.1 years. Fifty-five percent of respondents had subject exemptions on first enrolment for NZCE study : the range was one to ten subjects and the mean, four.

Over half of the questionnaire group were working at stage 3 when they dropped out; a further quarter were working at stages 4 and 5. Twenty percent of the questionnaire sample completed an Intermediate Certificate before withdrawal - a much higher proportion than the 8 percent of the record sample. There was no way of knowing whether this difference reflected bias in the questionnaire sample or gaps in the records.

7 Job And Study

One of the features of NZCE study which sets it apart from some other forms of tertiary study is the requirement for three years work experience. Consequently NZCE study is typically undertaken concurrently with a job at some stage of the course. It was therefore important to investigate the employment status of the students in the questionnaire sample, and to see whether their attitudes towards job and study, or the combination of the two, were likely to predispose them to dropping out.

Questionnaire respondents who worked while they studied for NZCE were asked to describe the type of job they had and to indicate whether they worked for a government department, a private firm or another organization. Information was also sought on their attitudes to work and study by means of several rating scales.

Employers

The great majority of students (88 percent) held jobs while studying. Table 21 groups their employers into three broad categories : the public sector, the private sector and local government.

The highest proportion of students who dropped out were employed in the public sector. Whether the figures reflect a greater proportion of NZCE students overall associated with public sector employment in the survey period is not known. But it is clear from recent figures reported by Imrie (1984, p.16) that, for Civil, Electrical and Mechanical options, the private sector now leads the public sector in the employment of NZCE students. AAVA's 1984 registrations for these three options showed 33 percent were employed by private firms compared with 25 percent in public employ. It is possible that the pattern of employment for NZCE

Table 21 *Employers of questionnaire respondents (N = 97)*

Employers	N
Public Sector	
Post Office	13
Ministry of Energy : Electricity Division	8
Ministry of Works and Development	6
Armed Forces : RNZN (3), RNZAF (1), Army (1)	5
Broadcasting Corporation	4
Railways Corporation	2
Air New Zealand	1
Total	39
Private Sector	
Electrical/electronic : manufacturing, maintenance	7
Engineering : manufacturing, maintenance, consulting	6
Draughting : engineering, energy, motor industries	6
Fitting and turning (4), tool making (1)	5
Radio and television : manufacturing, maintenance	3
General : labouring, servicing, maintenance	6
Total	33
Local government	
Regional authority	1
District Council	1
City council	3
County council	1
Municipal electricity department	4
Community college	1
University	1
Hospital Board	1
Total	13
Not employed	12

students has changed since the period for which the record data were collected.

Type of job

The job descriptions given by respondents generally included only the name or title attached to the job, for example, 'roading cadet', 'linesman', 'electrical apprentice', 'mechanical engineer', and the area of employment, such as the Post Office or the name of a private firm. A breakdown of the jobs held by former students in each option is given in the appendix. Despite the limited information that was supplied on the nature of the jobs two things are apparent : the student technicians represented a wide array of jobs, even within options, and the terminology used to define jobs varied also. Interestingly, the term 'technician' was not used frequently.

Attitudes to work while studying

The semantic differential technique was used to tap attitudes. Ten pairs of adjectives were arranged in bi-polar fashion at opposite ends of seven-point rating scales; for example:

Boring	1	2	3	4	5	6	7	Interesting
Useful	1	2	3	4	5	6	7	Useless

Respondents were asked to show the strength of their reaction to the pairs of adjectives, in relation to their jobs, by circling the number which they thought best reflected the strength of their feeling.

The pairs of adjectives were randomly arranged so that the pole thought to be more desirable did not always occur at the same end of the scale. In that way any tendency to respond towards one end of the continuum could be countered and response bias minimized. For statistical treatment and reporting, the adjectives were re-arranged so that the least desirable of each pair lay at the left of the continuum and the most desirable at the right. With polarity standardized in this way the values chosen by students for each pair could be averaged, enabling comparison of groups of students according to option.

Figure 11 graphs students' responses on the ten scales, and shows that, in general, employment was viewed positively rather than negatively. Students in all four options found their jobs interesting - even very interesting - easy, friendly, rewarding and pleasant. In addition, Telecommunications, Civil and Mechanical students saw their jobs as easy-going and organized, but somewhere in-between on the tiring/not tiring dimension. Telecommunications students experienced their jobs as a little more unhurried than hurried, while Civil and Mechanical students were undecided. Electrical students leaned more to the hurried side of the scale, found their work experiences slightly more strict than easy-going and not organized rather than organized.

Very negative attitudes came from all four groups on the usefulness of their jobs : they opted strongly for the 'useless' end of the scale. It seems likely that students rated this continuum after first asking themselves in what way their jobs related to their studies. For example, did their jobs help to make their study more meaningful? Did the jobs provide appropriate practical experience which could be called on in their studies?

Happiness in employment

After respondents had completed the attitude scale they were asked : *Were you reasonably happy in your employment while studying for an NZCE?* Over two-thirds (68 percent) of the students said they were happy, one-fifth (20 percent) said they weren't and the rest (12 percent) didn't respond.

Those who were unhappy with their employment were asked to indicate why by selecting reasons from a list of 10 items. Their responses are shown in Table 22.

Figure 11
Attitudes to Job while Studying

Responses to the statement:
'my job while studying was. . .'

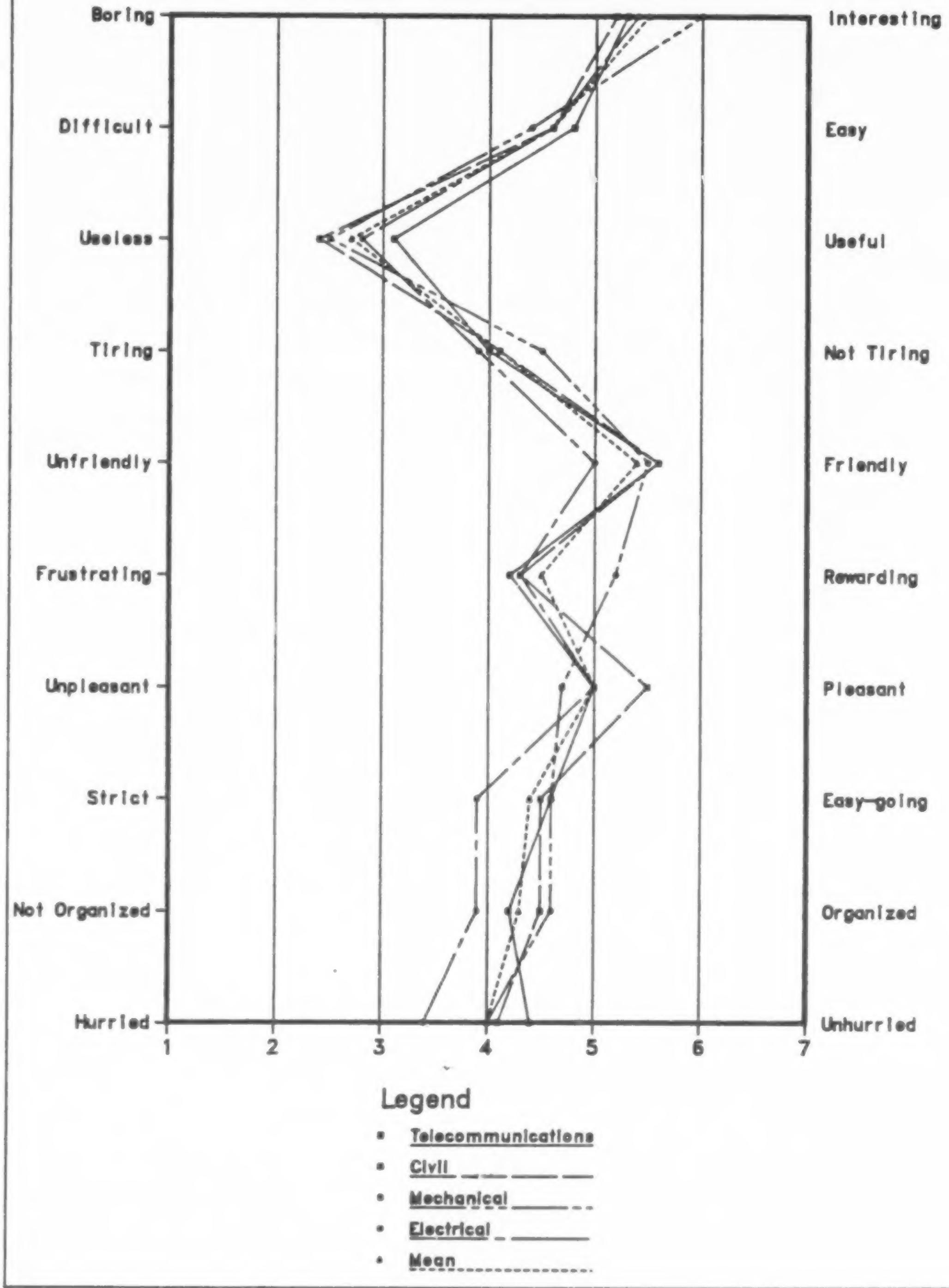


Table 22 *Proportion of respondents nominating particular reasons for unhappiness with employment (N = 19)*

Reason	%
I wasn't given work appropriate to my future qualifications or NZCE study	68
I had difficulty getting the required practical experience	60
I was in the wrong type of job	53
I couldn't see good promotion prospects	47
I didn't know what I really wanted to do (career)	37
There was a personality clash at work	37
My employer didn't "treat me well" (personal)	26
On-the-job training and NZCE study didn't mix	26
I was required to study against my will (as part of my job)	5

Problems in getting appropriate or required work experience, and the general unsuitability of the job, were given the most weight in accounting for unhappiness. But some of this weight could have resulted from the overlapping nature of the response items in question; that is, students who selected one may have been disposed to select other similar items as well. Such response overlap undoubtedly occurred between further items shown in Table 22, which indicates a variety of reasons for job unhappiness while studying.

The effect on study

As a following question, respondents were asked : *Did unhappiness with your employment affect your NZCE study?* Only 12 percent said 'yes'. Five of them had left the jobs they held as NZCE students, two to new jobs unrelated to engineering, three to attend university. One woman escapee to the university completed a B.Sc. subsequently.

Three others of the 12 identified unacceptable relationships with their immediate employers as the source of their unhappiness, but did not state how their study was affected. For example, two commented :

> Very poor controlling officer/staff relationships;
> favouritism shown to poor standard workers.

> Pinpricking criticism from a position of strength
> and without any arbitration.

One person, less well-qualified than those engineers under him, was too embarrassed to ask them for help with his study. Another was disenchanted with her work after promised day-release for NZCE study did not materialize.

Attitudes to mode of study

Respondents were asked to name the mode of study which formed their main method of tuition (e.g., full-time, part-time day-release, correspondence, part-time evening, long block, short block) and then to indicate how they felt about it. The same semantic differential technique, and pairs of adjectives used for assessing attitudes to job, were used.

Figure 12 shows how students in each of the four options regarded their main method of tuition. Interest in study, and attitudes to the human factors associated with study - friendliness, pleasantness, strictness, organization - were all positive, though cautiously so. Telecommunications and Civil students emphasized difficulty. This finding was consistent with earlier findings for Telecommunications students that associated subject difficulty with correspondence study. There may also be a link between difficulty and the part-time day-release pattern of Civil students.

Students in all four options found their studies more tiring than not, and all four rated the main method more useless than useful. It is not clear how students interpreted the useless/useful dimension though it is possible, given some of the qualitative comments, that ratings reflected frustrations resulting from conflicts between study and work and the dichotomy between theory and practice.

Summary

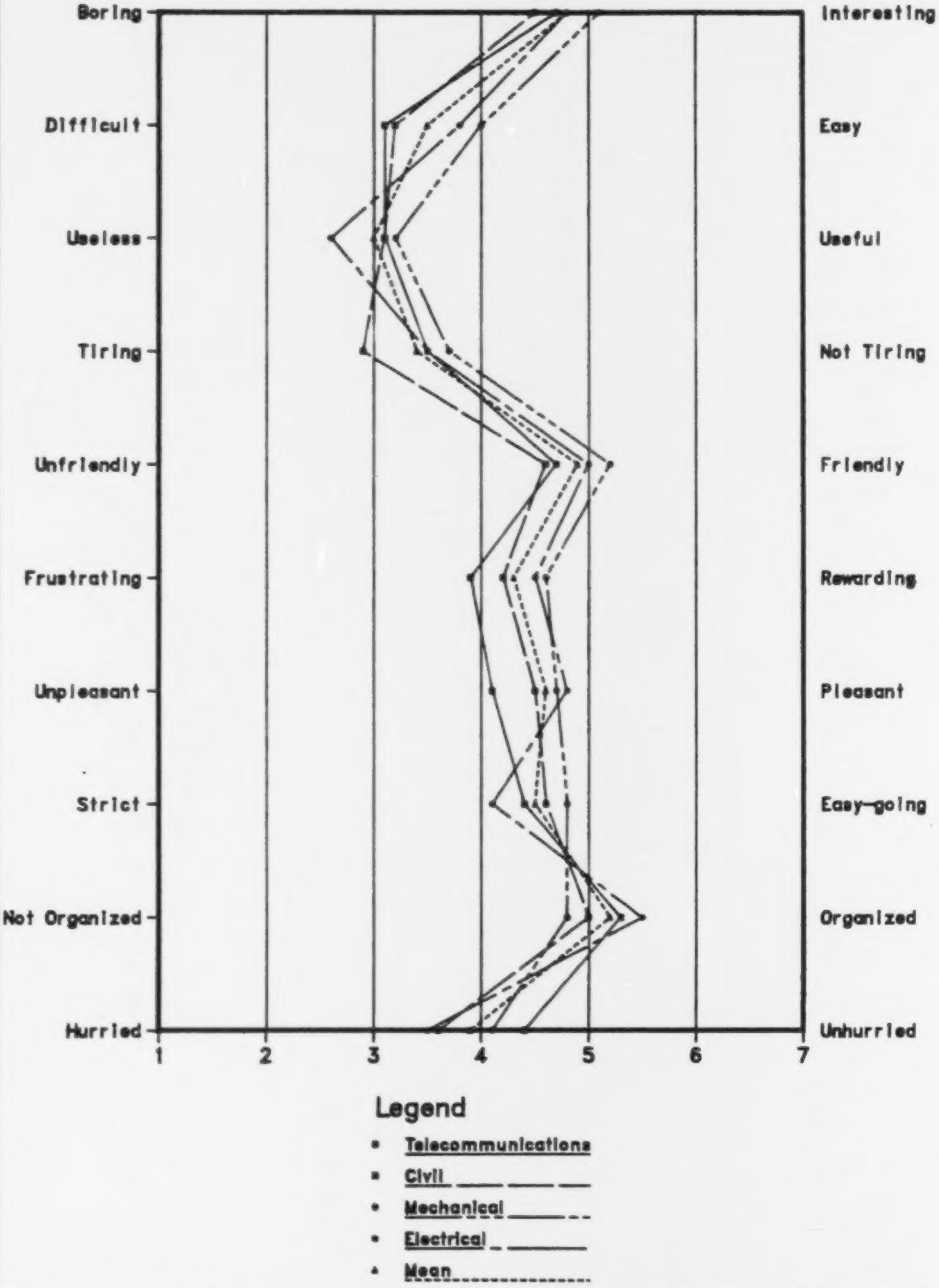
The preceding discussion reports the jobs held by students during their years of study, their feelings about those jobs and their feelings about their study. Attitudes were measured using the semantic differential technique; supplementary questions were also asked.

The great majority of students who dropped out held jobs while studying: 40 percent of them in the public sector, 34 percent in the private sector

Figure 12

Attitudes to Mode of Study

Responses to the statement:
'my job while studying was. . .'



and 13 percent in local government. Only 12 percent were full-time students.

Regardless of their option, students generally held positive attitudes to their jobs, the main exceptions being very negative attitudes expressed about job usefulness. The interpretation suggested for the negative rating was that students considered their jobs were of limited use in illuminating their studies.

Over two-thirds of respondents said they were reasonably happy in their employment while studying for NZCE. For the one-fifth who said they were not, the main sources of dissatisfaction were the inappropriateness of the work to NZCE study, problems in getting required practical experience and being in the wrong job.

Twelve percent of respondents (12 people) said that unhappiness with their work affected their study but the effect was not clearly defined in each case.

Interest in study, attitudes to the tone of their tuition method and feelings about course organization were all positive. The chief negative attitude displayed by students in all four options, but especially Electrical, concerned the uselessness of their study. This finding, in the light of other written comments, suggests that some of the former students had problems in establishing meaningful links between study and job.

8 Difficult Subjects

Inability to cope with the level of work in the subjects taught is one obvious potential reason for dropping out of a course. In the questionnaire survey the respondents' perceptions of subject difficulties were investigated with the question : *Did any subject or course prove to be especially difficult?* The subjects named as difficult and the number nominating each are shown in Table 23.

One subject - mathematics - accounted for over half of the 52 affirmative responses. Mechanics and electrotechnology/electricity between them accounted for a further quarter of the total. Technical drawing, electronics, English, telecommunications, physics and workshop technology accounted for the remainder.

Mathematics

Table 24 shows the mode of study and option for 29 students who nominated mathematics as especially difficult: mathematics III was named by 19 students, twelve of whom studied the subject by correspondence. A further six who nominated mathematics at a lower level were also studying by correspondence. Thus, just over two-thirds of those who found mathematics especially difficult were studying with the Technical Correspondence Institute.

Civil students were less likely to have problems with mathematics. Although Telecommunications students reported only marginally more problems with mathematics than Electrical students, they had most difficulty with stage 3 mathematics. The combination of mathematics III and correspondence study looked to be a tricky one for Telecommunications students : it may warrant further investigation beyond this study. In the wider context

Table 23 *Difficult subjects according to option*

Subject	Civil N	Mechanical N	Electrical N	Telecommunications N	Total N	 %
Mathematics	5	7	8	9	29	56
Mechanics	6	2	1	0	9	17
Electrotechnology/ Electricity	1	1	3	0	5	9
Technical drawing	0	2	1	0	3	6
Electronics	0	0	1	1	2	4
English	0	0	1	0	1	2
Telecommunications	0	0	0	1	1	2
Physics	1	0	0	0	1	2
Workshop Technology	0	1	0	0	1	2
Total	13	13	15	11	52	100

Table 24 *Students nominating mathematics as difficult, by mode of study and option*

Mode of study	Civil	Mechanical	Electrical	Telecommunications	Total	
	N	N	N	N	N	%
Correspondence (TCI)	2	4	5	7	18	62.1
Full-time day	1	0	2	0	3	10.3
Part-time day	1	2	1	0	4	13.8
Part-time evening	1	1	1	0	3	10.3
Part-time day/evening	0	0	0	1	1	3.5
Total	5 (3)	7 (5)	9 (4)	8 (7)	29 (19)	100.0

Note: Numbers in brackets refer to mathematics III.

mathematics and correspondence study for all students may deserve closer attention.

Reasons for difficulty with mathematics

What did students perceive as the reasons for difficulty? Their written comments show the range of concerns : first, concerning mathematics III. Some students associated their difficulty with correspondence study, in particular with the lack of personal tutor help:

> Difficult by correspondence - found I could manage it with constant help only (from an engineer friend).
>
> My downfall was maths III - perhaps I should have tried the local Polytech for that subject instead of correspondence ... I had not done any difficult maths for 5 years. [Left school in 1968]
>
> Tried correspondence (not easy).
>
> I find it extremely difficult to follow the TCI maths III assignments. [Study in the Navy]
>
> Tried doing maths III by correspondence (TCI) and found it difficult when I came up against a problem and couldn't get immediate help, unlike a classroom situation. Only got through 75% of course. Unable to comprehend by correspondence.

Others felt they lacked background in the subject, had insufficient time, or could not see the relevance of the subject to the job in hand. Typical comments were:

> Not enough background on basics.
>
> Lack of study time.
>
> Subject matter too unrelated to real work problems.
>
> Long period between attempt at maths and departure from school. [Left school in 1970]
>
> Only had 10 weeks to do whole subject before exam. Subject was too difficult.

What of the mathematics III students who studied face-to-face? Were their problems qualitatively different? One such student wanted more tutor support : the system was too competitive and he would have liked tutorials. Some found the gap between leaving school and studying NZCE mathematics III too great; others found the work too difficult. Some found the work load too heavy, and one found that elements of mathematics III 'seemed to have little bearing on actual engineering skills'. The same student, moving straight from school to a technical institute, took some time to learn independent study habits in an environment where there was less direct contact with tutors and greater expectation of self motivation.

Some of the same reasons for finding third stage mathematics difficult were given by both TCI students and others. The correspondence students had particular concerns, though, which seemed to characterize study by correspondence : a need for personal help and more immediate feed-back were probably the most insistent. Feelings of inadequacy, for whatever reasons, seemed likely to be exacerbated when personal guidance was not at hand.

The students named mathematics at a lower level as their most bothersome subject. Six of the ten were students of the Technical Correspondence Institute, and three of them gave correspondence study as their reasons for having difficulty:

> Long delay in obtaining answers to problems - usually only after next assignment commenced.
>
> Too many questions to ask, and no answers.
>
> Correspondence system.

Of the other three, one found too little time because of work demands, one linked job and study ('excessively long calculations and insufficient time for study due to type of employment') and one thought that it was probably his own lack of interest which was at the root of his difficulty.

Of the four face-to-face students, two found the gap between sixth form mathematics and NZCE mathematics too great ('those who had been through seventh form found it much easier'), one was lacking in motivation and one had no previous background to call on.

Mechanics

Nine students found mechanics difficult. All but two were part-time day release and/or part-time evening students; one combined correspondence and part-time study. Three of the nine could be identified as women by their comments, and six were in the Civil option. Grasp of the underlying principles of the subject, and their application, seemed the main concern. Declared reasons for difficulty were:

> I found it difficult to apply the theories. [Female]

> Could not relate some of the theory to previous experience and work.
>
> Too many formulae to apply. Basic theory is not explained simply enough.
>
> Mainly just not within my understanding especially when done by correspondence. It was easier second year studied when done at local polytech. [Female]
>
> Abstract thought needed.
>
> Own mechanical ineptitude. [Female]
>
> Too detailed.
>
> Mechanics relied on everything being understood during the relevant lecture. If not you fell behind. [Full-time]

Unlike mathematics, which all students have studied at school, mechanics is for many students a new subject with new concepts to grasp, different ways of thinking to master, and unfamiliar theory to relate to practice. These features seemed to overwhelm some students in the sample, though not in sufficient numbers to warrant generalization to a wider population. Nevertheless, there may be a hint in the comments of these few students to justify looking more closely at how students in general cope with the study of mechanics. The comments of the three women quoted above are particularly interesting; they suggest that women, perhaps because they do not bring the same background or set with them as men, may need specific help to understand unfamiliar concepts in mechanics and to build up self confidence in moving into a traditionally male domain.

Other subjects

Comments on other difficult subjects suggested no readily generalizable reasons for breaking off study. Of the 14 students, in addition to the 38 who named mathematics and mechanics, all except one were part-time students : one part-time day, six part-time evening, two a combination of the two, one studying through TCI and one on short block courses.

If one reason for experiencing difficulties stood out, it was lack of background in, or understanding of, the particular subject. For example:

> Inability to comprehend visible forces. [electricity]
>
> The theory was not used in a practical way in my job so was difficult to grasp. [telecommunications technology]
>
> I had taken an academic course at high school and found the subject difficult to comprehend. [drawing]

> Lack of practical background at time of study. [technical drawing II]
>
> Lack of basic knowledge. [physics]

Two students had problems with lecturers: one found the lecturer 'glib and not tolerant' (electronics II), the other was unable to understand his lecturer's accent (telecommunications technology). One student had trouble coping with the reading demands of his course (English); another, for whom English was a second language, could not understand English properly at the time of his study (electronics, electrotechnology). Two students found the scope of the work they were required to do in particular courses more than they wanted to persist with:

> Wide range of subject matter, making revision like a lucky dip. [electrotechnology V]
>
> Lab work required work out of proportion to marks available. [mechanical technology]

Summary

This chapter summarizes information and comment from students on subjects they found difficult. Fifty-two students (54 percent of the sample) reported subject difficulties. Three subjects accounted for over two-thirds of the difficulties : mathematics (56 percent), mechanics (17 percent) and electrotechnology/electricity (9 percent).

Of those who nominated mathematics, just under two-thirds were studying by correspondence, more than half of those, mathematics III, the remainder, at lower levels. The combination of mathematics III and correspondence study looked to be a particularly difficult one for Telecommunications students. Lack of immediacy, slow feedback and a desire for direct contact with tutors characterized students' attitudes to studying mathematics by correspondence. Students attending teaching institutions, whether full-time or part-time, noted the gap between their own mathematics knowledge and the demands of their courses. Some expressed a wish for tutorial help.

Grasping the underlying principles of the subject, and their application, seemed the main concern of those who expressed difficulty with mechanics. Comments on other difficult subjects showed no readily identifiable pattern of difficulty beyond feelings of inadequacy deriving from lack of background and basic understanding.

9 Reasons For Dropping Out

Dropout decisions are rarely simple. The decision of the individual to withdraw from study is more likely to result from a number of forces than from a single reason arising at one time. The questionnaire was designed to be as comprehensive as possible in order to reveal something of the complexity and variety of reasons for withdrawal from NZCE study.

The questions used to investigate reasons

Although one question in particular asked about reasons for dropout, other questions yielded useful supplementary information. The final question, an open one, sought to tap perceptions on causes of dropout in general. That question was: *Are there any general comments about your NZCE study which will aid us in understanding why some students withdraw from their NZCE studies?*

The question which focussed specifically on reasons for dropout was: *Which do you consider the main reason(s) for withdrawing from your NZCE studies?* The question was followed by a checklist of 16 statements to which 'yes/no' responses were sought. There was also an 'other' category for reasons not covered by the 16 statements. After responding 'yes' or 'no' to each statement, according to whether or not it applied to them, respondents were asked to : *Go back and pick the* *one* *reason that stood out above all others.*

The range and importance of reasons

For most students this two-stage procedure yielded a number of reasons for withdrawing, as well as a single predominant reason. The terms 'multiple reasons' and 'main reason' are used to distinguish the two stages of response.

The first part of the question - to do with 'multiple reasons' - threw the net wide, and people were encouraged to respond with a range of concerns. In the second part, focus was on the single most important 'main reason' for dropping out. On average the 97 respondents identified three concerns apiece (293 'yes' responses in all). The number of reasons given by individual respondents ranged from 0 to 9, the median being 3.

Table 25 records the rank order of statements according to 'main reason' and the percentage of respondents who chose each one as a dropout reason, either as one of a number of reasons ('multiple reasons') or as a single 'main reason'.

The classification of reasons

The discussion of response trends is based on the classification of reasons including 'other', into four categories: *course-related*, *job-related*, *commitment/interest* and *personal*. The classification meant that significant general areas of influence could be examined without obscuring the impact of specific reasons for dropout. Table 26 shows how the dropout reasons were distributed among the four categories.

Table 25 *Reasons for withdrawal from NZCE study*

Reason	Main reason Rank	Main reason %[1]	Multiple reasons Rank	Multiple reasons %[2]
I didn't find NZCE study easy. It was too difficult	1	14.4	3=	24.7
I changed to a job where NZCE study was not necessary	2	10.0	5	23.7
Studying by correspondence didn't suit me	3=	8.9	1=	25.8
I didn't know what I wanted to do at the time I started NZCE study and lost interest	3=	8.9	6=	21.6
I decided NZCE study wasn't for me	5	7.8	1=	25.8
The NZCE qualification was no use to me in my job	6	5.6	6=	21.6
I didn't get enough time off work to study	7=	3.3	8=	19.6
I didn't need to complete the whole NZCE course for my job	7=	3.3	8=	19.6
My sporting/recreational commitments interfered	7=	3.3	11	14.4
I married	10=	2.2	10	15.5
I missed out on a key exam so I gave up	10=	2.2	13	9.3
I took on too much study and was overloaded	12	1.1	3=	24.7
I shifted to another town	-	0.0	12	11.3
I didn't have enough subject exemptions when I started study	-	0.0	14	4.1
I didn't get on with one/some of my tutors	-	0.0	15	3.1
I transferred to a university engineering course	-	0.0	16	2.1
Other reason : please specify	-	28.9	-	35.1
Total		100.0		

[1] Percentages are out of 90, the number of respondents who gave a main reason.

[2] Percentages are out of 97, the number of respondents who gave multiple reasons.

Table 26 *Reasons for withdrawal from NZCE study, by category*

Reasons [1]	Main reason		Multiple reasons	
	Rank	% [2]	Rank	% [3]
Course-related				
I didn't find NZCE study easy. It was too difficult	1	14.4	2=	24.7
Studying by correspondence didn't suit me	2	8.9	1	25.8
Other : Length of study was too much	3	4.5	6=	4.1
Other : Various	4	3.3	6=	4.1
I missed out on a key exam (so I gave up)	5	2.2	5	9.3
I took on too much study and was overloaded	6	1.1	2=	24.7
I didn't have enough subject exemptions when I started study	-	-	6=	4.1
I didn't get on with one/some of my tutors	-	-	4	13.1
Sub-total		34.5		(33.1)
Job-related				
I changed to a job where NZCE study was not necessary	1	10.0	1	23.7
The NZCE qualification was no use to me in my job	2	5.6	2	21.6
Other : Lack of suitable employment	2=	5.6	5	5.2
I didn't get enough time off work to study	4=	3.3	3=	19.6
I didn't need to complete the whole NZCE course for my job	4=	3.3	3=	19.6
Other : Problems relating to job demands and block courses	6=	2.2	7	2.1
Other : Various	6=	2.2	6	3.1
Sub-total		32.2		(31.4)
Commitment/Interest				
I didn't know what I wanted to do at the time I started NZCE study and lost interest	1	8.9	2	21.6
I decided NZCE study wasn't for me	2	7.8	1	25.8
Other : Change of career	3=	1.1	3	3.1
Other : Various	3=	1.1	4=	2.1
I transferred to a university engineering course	-	-	4=	2.1
Sub-total		18.9		(18.1)
Personal				
My sporting/recreational commitments interfered	1=	3.3	2	14.4
Other : Family	1=	3.3	4	6.2
Other : Emotional	1=	3.3	5	3.1
I married	4=	2.2	1	15.5
Other : Various	4=	2.2	6	2.1
I shifted to another town	-	-	3	11.3
Sub-total		14.4		(17.4)
Total		100.0		

[1] The reasons itemized in the questionnaire are indicated by italics.

[2] Percentages are out of 90, the number of respondents who gave a main reason.

[3] Percentages are out of 97, the number of respondents who gave multiple reasons. Sub-total percentages in brackets show the proportion of multiple reasons in each category. These percentages are out of 293, the total number of mentions for multiple reasons.

The items used in the checklist were weighted towards course-related reasons with six in that category. Four items were clearly job-related, three referred to commitment or interest, and three were personal reasons. The weighting given to course concerns such as exemptions, study overload and level of difficulty seems justified in an exploratory investigation of dropout from an educational course.

That job-related reasons for dropout should almost equal course-related reasons in the final analysis, indicated that it was not the number of statements assigned to each category which was important but the universality of each statement, and the accuracy with which it represented the reality of student worries. In any case the tendency to go beyond the confining statement was evidenced by the percentage of respondents who nominated 'other' as one of several reasons (35 percent), or as a main reason (29 percent), for dropping out (Table 25).

Course-related reasons accounted for one-third of dropout decisions, whether under 'multiple reasons' or 'main reasons'. The number of *job-related* reasons was only slightly lower. Between them these two categories made up two-thirds of the reasons for withdrawal. This weighting was not surprising and will be explored in the ensuing discussion.

The *commitment/interest* grouping with a little less than one-fifth of reasons in both 'multiple' and 'main' divisions represents an important area of human decision-making. *Personal* reasons, comprising a lower percentage of 'main reasons' than of 'multiple reasons', and the lowest overall proportions in any of the four categories, gave an insight into some of the external causes of dropout.

We now turn to a more detailed scrutiny of reasons based on the information shown in Table 26.

Course-related reasons

Three of the top four 'multiple reasons' for dropout were course-related: they were concerned with course difficulty, correspondence study and study overload. Each of them was cited by a quarter of the questionnaire sample. The first two - course difficulty and correspondence study - were also among the top four 'main reasons'.

Exam failure, too few subject exemptions and tutor incompatibility, while attracting a total of 16 responses under 'multiple reasons', were seen as a 'main reason' for dropping out by only two students - both for exam failure.

Course difficulty

Course difficulty was the top 'main reason' for dropout and third-equal with study overload under 'multiple reasons'. One student linked his difficulty to lack of background:

> Mature students like myself may find lack of earlier education in basic subjects too big a hurdle to overcome.

Another student found the study routine of NZCE too difficult to settle to, not having studied since completing a trade certificate some years earlier.

Correspondence study

Correspondence study ranked first-equal under 'multiple reasons' and third-equal as a 'main reason' (Table 25). Studying at a distance, as noted in the earlier discussion on difficult subjects, was plainly difficult for many students. Excerpts from general comments on NZCE study serve as illustration. First, from a student who found a combination of increasing subject difficulty, lack of immediate tutorial help and slowness of feedback too much:

> Correspondence study becomes more difficult as the subject increases in difficulty because you cannot ask anyone for an immediate answer. By the time the answer comes back from the tutor you have started on the next paper.

For some, the difficulty of correspondence study was dominant:

> Work on a construction site requires the course to be done by correspondence which is hard going.
>
> If I had the further opportunity to study for NZCE fulltime I believe I would be successful but on a TCI assignment basis I find it extremely difficult.
>
> Correspondence was very convenient time-wise but difficult if any problems arose (have to wait a week for answer and generally would have forgotten problem by then). Technical Institute was much more helpful and informative.

Motivation to persist with correspondence was an issue for some:

> Course content was OK. Problem was motivation from personal viewpoint as far as correspondence went. Would prefer classroom situation, either part-time classes or block courses, but distance and time-off is a problem.
>
> As an apprentice living away from the city, and a shiftworker since, I have been compelled to study via TCI. Being lazy I have not enjoyed studying on my own; I feel I would have completed the NZCE if in a classroom situation.

Study overload

Study overload, selected as a reason for dropping out by a quarter of all respondents under 'multiple reasons' was chosen as the main reason by only one student. Students apparently felt study overload to be an important factor, but not the chief one; it was clearly experienced but perhaps in combination with other factors which adversely affected study.

Length of study

From the 'other' reasons, length of study emerged as a 'main reason' for four people:

> Four years study for Trade Cert plus Advanced Trade had enough.
>
> Four years continuous study enough for my age group,
>
> Too much study.
>
> Length of time completion would take.

Teaching and classroom considerations

Further reasons for dropping out came from students' general comments. Several of these focussed on teaching and classroom issues. Lack of teaching skill was one criticism:

> Some of the tutors are very bad teachers. They may have the technical knowledge but often teaching technique and ability to teach effectively is negligible, ... I suggest that tutors be sent to training college for a month or so, so they can learn how to teach.
>
> Though teachers were good in their respective subjects they did not have the ability to get the message across.

Management, relationships, classroom climate and class size were also criticised:

> Some tutors were too easy-going and allowed those who were easily distracted to miss out on a lot of explanation on that subject.
>
> Lack of class unity for those working - each person is an island and little interaction between those of the same classes and in the same year of study.
>
> Most teachers tended to treat us like children. One sarcastic maths teacher didn't help those who were not so good.
>
> For part-time students time must be found for rapport between students and not to appear to compete but to share each other's problems : e.g. extra tutorial; often it is only the key that is missing.
>
> Too many students in some of the classes limited what the teacher was able to achieve. Very little individual attention for problems.
>
> I can't really fault the NZCE course (though) I disliked the way we were treated in full-time Tech as if we were children and still at school.

Transition to NZCE study

Transition from school to NZCE study carried challenges which proved too much for some people:

> Whilst at school I was used to having constant pressure being applied to get me to work and hand in assignments. Whilst I worked hard at school the thought of the consequences was enough to keep you working. When I went to tech there was little pressure to finish assignments and to work hard. And at tech it is the student's decision to work and reach his goal rather than the tutor's pushing you through the course.
> ... By the time I realised it was up to me to get my work done it was a bit late in the year ...
>
> I think the leap from the sixth form to Polytech is too great. I personally found it hard with maths and tech drawing because of my schooling. Although I did get UE maths I couldn't take tech drawing.

Course content

The perceived inadequacy of course content apparently influenced the decisions of some people not to persist with NZCE study:

> The subject material was very much out of date ... Since ceasing NZCE studies I have done selected courses at university which, while not directly related to my employment seemed to be nearer than the NZCE material.
>
> The main reason for my study was to learn as much of the subject electronics as possible. However in the final year found specialised subjects not up to date with new technology.

One former full-time student looked for a better balance between theory and practice:

> Two-hour periods of theory and text-book examples do not enhance keen, bright thinking minds. More like tired, overloaded unthinking sponges. Leaving the practical experience to the cadetship stage is unhelpful and does not contribute to the student's own perception of his or her career.

Mode of study

Not being able to study by their preferred mode was advanced by some respondents as an influential course-related reason. Full-time study, including block courses, had its advocates. One woman student, who because of the social pressure of part-time study in 'male-orientated subjects' had given up, said:

> Having since studied full-time at university I feel full-time study is by far more efficient and worthwhile.

Others commented:

> Consider full/part-time at technical institute preferable to TCI study ... TCI suited my requirements but block/ sandwich courses, if financially could have been afforded, would probably have seen me completing NZCE.
>
> I would prefer to sit all classes and exams in one block rather than part-time classes. (i.e. as in 3 in 1 year).

Other main reasons

Three other 'main reasons' were idiosyncratic : problems because of English as a second language, difficulty understanding an immigrant teacher's accent and transport problems arising from re-location of an engineering school.

Job-related reasons

The four most important job-related reasons were ranked in the same order under 'main reason' as under 'multiple reason'. The prime job-related reason for dropout was changing to a job where NZCE study was not necessary. Two of the other important job-related reasons were closely related in theme to this top-ranked reason as the following discussion shows.

Low value accorded NZCE study

Three of the four job-related items that were given the most weight in the selection of reasons for dropout were all variants of a common utilitarian theme : NZCE was not necessary, it was no use in the job, or its completion was not needed. Hence it is likely that these items attracted a fair amount of response overlap under 'multiple reasons'.

I changed to a job where NZCE was not necessary was the second most important 'main reason' overall; it was also mentioned by just under one-quarter of respondents as a 'multiple reason'. But it is not entirely clear what 'necessary' implied to respondents. It could have been interpreted as a condition of employment, as say in a cadetship, or as confirmation of serious intent in the job. Or even both, as the first comment below shows:

> Actual related qualifications (Tech or University) don't appear to be important in private industry. Only to prove application. My NZCE study to the time I changed jobs appeared to do that.
>
> Possibly an underlying reason for my withdrawal was that as NZCE was not a direct requirement for my job then there was little motivation to complete the work.

Although the statement, *I didn't need to complete the whole NZCE course for my job,* attracted a fifth of all respondents under 'multiple reasons' it is not clear what meaning it had for respondents. Yet there was surprisingly little response overlap between this statement and the previous one relating to changing job.

Lack of usefulness of the NZCE was cited by over one-fifth of the sample under 'multiple reasons' for dropout. The following range of comments indicates that lack of relevance or lack of applicability of NZCE studies to the job were the main considerations underlying judgements that the qualification lacked use:

> I found the NZCE study had no bearing on my work as an apprentice. This lead to no practical backup theory. [Electrical apprentice, NZR]
>
> In the final year found specialised subjects not up to date with new technology. That had little or no educational value for my employment in the field.
>
> For me NZCE was not as relevant in my job even if the certificate was interesting. Also my trade qualifications - ATC (TV, Communication) - and electronics background, gave me a different slant on the subject. NZCE was for power board personnel *not* electronics. [Electrical and electronics technician - university]
>
> NZCE did not really relate to my type of employment. Work experience did not help as it was a different field to NZCE Mechanical. [Draughtsman for ventilation and heating company]
>
> I would have liked to take an NZCE course more allied to the large scale industrial refrigeration industry. The nearest offering (heating and ventilation) has very little to offer ... I am very surprised that such a prime NZ industry has no NZCE course offering on the engineering side, especially as the meat technology side is amply covered. [Shift engineer at freezing works]

For one respondent the NZCE had insufficient value in a competitive job market, offered inadequate financial reward for the effort involved, and left the holder with ambivalent job status:

> Five years ago NZCE was a very sought after qualification, but today I feel that there are far too many highly qualified people on the job market looking for jobs (including BEs). Therefore I decided to remain less qualified but to gain more practical experience. I also feel that the amount of study required to gain NZCE is very high and the amount of remuneration (pay) does not justify such efforts. Also NZCE leaves you halfway between an engineer and a tradesman. Neither here nor there. [Electrical apprentice with a supply authority]

Lack of time off work for study

Lack of time off work for study was given by one-fifth of respondents as a reason for dropping out but as the 'main reason' by only three people. However, it also emerged as a particular problem in relation to block courses for two students under 'other', and was mentioned by some respondents in general comment.

> At the time of commencing NZCE studies I was required to work overtime nearly every evening. This reduced the number of hours available each week for study. I then felt I had to rush the assignments... Quite often an assignment was returned with a considerable amount of rework to be done. This further loaded up my studying time which meant assignments took even longer to complete. End result too time consuming and very frustrating.
> [TV technician]

> At the time I was studying Industrial Instrumentation and Stage IV required a block course. I changed jobs and my new employer would not allow me the extended time off work.
> [Industrial instrumentation and control apprentice - private firm]

> My job involves block courses away from home, making it difficult to do regular study for NZCE.
> [Storeman]

> I last studied in 1974 when I completed trade certificate and I found it difficult to get back into a study routine. Also because of work pressure I didn't have enough time to concentrate on my studies and to complete the work required.
> [Site supervisor - mechanical services]

> Shifts and study do not mix very well. Sometimes have to sit exams in afternoon after having done 8 hours work in morning. This affects exam results.
> [Shiftworker in power station - private firm]

> It was very tiring working a full-time job as well as doing two evening classes of four hours duration as well as doing two day classes and studying for radio technician certificate by correspondence.
> [Radio and TV technician apprentice - private firm]

> The firm I worked for allowed 2½ hours a week off for attending lectures; over that had to be made up which seemed impossible when attending night classes also.
> [Draughtswoman in structural engineering]

Lack of suitable work experience

It was evident from written comments that the AAVA requirement of relevant employment or work experience could not always be met. Lack of suitable employment could sometimes spell the end of NZCE study as these comments show:

> I am not suitably employed and haven't had three years suitable work experience ... This impasse situation has forced me to turn to other similar courses that don't have such restrictions and a pass in which would be of greater value in securing employment.
> [Assembler - painter for manufacturer of heavy machinery]

> Inability to obtain employment in relevant field because of my age. Employers preferred hiring those that fitted into the lower wage bracket.
>
> Changed to a university course (not engineering). No job to carry on part-time NZCE study.
>
> When I completed my full-time year I was not prepared for the lack of employment for part-time study in civil engineering. I therefore decided to go to university.
>
> Couldn't get a job so after working in a 'non-NZCE' job for 1 year then went to university. The university BE seemed more appropriate to me since I could complete it without having to worry too much about getting a job to complete it.

Even though (in the next example) the employment was potentially relevant to NZCE studies the actual work allocated may not have been:

> I wasn't getting the work in my employment relevant to my studies so began to take the attitude 'why should I do correspondence and give up my time when I wasn't getting the work to justify it'. Also didn't intend being a 'career' girl so put my husband and home first. ... It wasn't until I actually gave up doing NZCE that my boss suggested perhaps I would have been better studying for certificate of draughting rather than NZCE. I much preferred drawing plans of survey work rather than engineering work which I found difficult to understand.
> [Draughting cadet - local body]

Rather than concern about a concurrent job shortage two people quit because of an anticipated future shortage of jobs for NZCE graduates:

> There were not enough examples of jobs for qualified NZCE students to aim at (and pay scales).
>
> Uncertainty of future employment in their field.
> Better opportunities elsewhere.

Reasons related to interest and commitment

Because of their lack of specificity the main statements in this category appeared to go beyond particular concerns about job or course to broader notions of commitment and interest in relation both to engineering and to occupational choice. However there was rarely sufficient information in the questionnaires on which to base conclusions about the underlying motivation of those who withdrew because they had lost interest or realized 'NZCE wasn't for me'. By and large, therefore, the following discussion is based on the limited information deriving from 'yes/no' responses to the checklist of reasons. Qualitative information is added when it is available.

Overall, a little under one-fifth of 'multiple reasons' were of the commitment/interest kind and there was a similar proportion of 'main reason' responses. Two statements accounted for the majority of responses.

I decided NZCE wasn't for me ranked first equal among all 'multiple reasons' for dropout (26 percent of respondents), and fifth as a 'main reason' (7 percent of respondents). One former student wrote:

> During the year that I studied for NZCE I discovered this sort of job was not for me. However, all engineering cadets were getting the same basic training as the mechanical apprentices and it was this sort of job (fitting, turning and machining) that I liked. So I was happy with my employment but indifferent towards NZCE study as that side isn't what I wanted to do.
> [Engineering cadet - NZED]

I didn't know what I wanted to do at the time I started NZCE study and lost interest ranked sixth-equal among 'multiple reasons' (22 percent of respondents) and third-equal as a 'main reason' (9 percent of respondents). Two 'main reason' respondents wrote:

> Couldn't see a lot of future as far as financial success is concerned in the jobs that were available at the time I was at Tech. All my friends were employed eventually. However, very few would have been satisfactory for me.
>
> After 17 years at school I was generally sick of the system. University would have probably been a better idea.

A third statement, *I transferred to a university engineering course*, attracted two respondents though not as their 'main reason' for pulling out. Under 'other', three people cited career change as a reason for withdrawal, one of those as a 'main reason'.

> Completely changed my career to primary teaching.
> ... Because I was dissatisfied with my employment I changed careers although I have always retained an interest in that line and have completed similar study since - BSc in geography and geology.
> [Female lab technician in soils and materials testing laboratory]

> I enrolled as an NZCE student after failing miserably at university. After two part-time years of NZCE study and a bit of growing up I returned to university and graduated (BSc) after two further years of full-time study.
> [TV technician - private firm]

Personal reasons

There were three personal statements in the question, covering a fairly narrow range of possibilities - getting married, shifting town and the interference of sporting/recreational commitments. Five respondents in total chose one of these as a 'main reason' for dropout: two because of marriage; three because of sporting/recreational commitment; none because of shifting town. On the other hand, under 'multiple reasons', 15 respondents cited marriage, 14 sport/recreation and 11 shifting town as dropout reasons. Thus personal reasons figured in a number of instances but not often as the most important single reason.

The range of personal reasons was extended by those who opted for the 'other' category : 11 under 'multiple reasons', eight as a 'main reason'.

Three of the eight gave family reasons, including 'starting a family', 'house-building and other personal commitments' and 'time taken up with a growing family'. Another three gave emotional reasons which included 'a nervous breakdown' (triggered by study), and emotional problems associated with the death of a parent. Other personal reasons were disillusionment with the financial return for the effort involved in study, and overseas travel.

Reasons for withdrawal after completing Intermediate Certificate

One original purpose of the study was to find out, if possible, why students withdrew after completing stage 3 and qualifying for an Intermediate Certificate. Nineteen students in the questionnaire sample (20 percent) had done so (see Table 20). They were asked their main reason for stopping study at that stage and their responses were categorized into *course-related, job-related,* and *other* categories.

Of the five students who cited *course-related* reasons three were in Telecommunications, one in Civil and one in Mechanical. One student (Mechanical) gave dissatisfaction with the teaching received, the other four cited correspondence study as the main reason for giving up study:

> The study was becoming increasingly difficult by correspondence and it was not suitable for me to go on a block course.
> [Telecommunications]
>
> I had been transferred in my job and I find study by correspondence difficult.
> [Telecommunications]

In addition, two coupled their disaffection with correspondence study to the unavailability of the courses they needed in smaller local institutions:

> I couldn't get classes at community college because of lack of numbers and didn't want to do correspondence.
> [Civil]
>
> Only telecommunications technology was needed - I moved to Palmerston North and this was not available at PNTI and I found I could not handle the correspondence course. It is still not available now I am at New Plymouth.
> [Telecommunications]

Five students gave *job-related* reasons for discontinuing, for example:

> Stopped in fifth year as specialised subjects not applicable to real employment.
> [Electrical]
>
> Wasn't any advantage in having NZCE in my job.
> [Electrical]

One of the five, a woman, felt some discrimination on the part of her boss. Her attitude influenced her decision to cease NZCE study.

Four students - two Telecommunications, one Civil and one Mechanical - gave up because of *personal* reasons: time given to study taking time away from family; having a family; too many other family commitments. The five remaining students gave a variety of *other* reasons for discontinuing: taking up farming; returning to university; overseas travel; switching to another course.

On balance, the reasons for giving up NZCE study after Intermediate Certificate seemed to cover the same range as those given by all students. There appeared to be no particular factor associated with higher-level study which could be said to precipitate dropout.

Intention to complete NZCE

Respondents were asked the question: *Do you intend to complete your NZCE studies one day?* Forty-four (45 percent) said 'yes'; 52 (54 percent) said 'no'; one person didn't say. Forty of those who responded in the affirmative gave their main reason for not continuing at present. Thirty percent of the reasons were family-related, sometimes in association with work and other commitments:

> No quiet place to study, house full of noisy children. Am building a workshop where I might get a bit of peace and quiet to study.
>
> Building extension to house and garage and studying computer chess (recreation).
>
> Family commitments along with other outside activities I see as being very important.
>
> Completing work around a relatively new home (fences, workshed etc.). Hobbies and a new baby consume a fair amount of my evenings.

Work-related reasons amounted to 20 percent of the total. They included work load, travel out of the country on the job, compulsory overtime, refusal of time off work for study, and the non-availability of relevant practical work. One person saw the possibility of promotion without NZCE, though it was work and community involvement which kept him from continuing:

> Fully involved with work and community and my promotion opportunities may lead to a position where I don't require NZCE.

The other 50 percent offered a variety of explanations. A few were course-related : no suitable course at the local community college; unwillingness to study by correspondence; inability to attend block courses; urban transport problems because of engineering school re-location.

Others (18 percent), who had changed jobs, or switched to different, though related, courses said that they intended to return to study. In some of these cases return seemed likely, for example:

> Waiting till I finish my studies for qualification as a PO telephone technician.

In other cases the likelihood of return to study seemed more remote:

> Only if I changed jobs and worked in telecoms field again. (Presently working as computer systems analyst).
>
> I work at sea as a fisherman and don't have the time for study.
>
> Lack of motivation. Present job does not require NZCE but future jobs may.

One person who had expressed an intention to return to NZCE study was clearly ambivalent about it:

> At different stages I had considered returning to NZCE Civil or one of the other courses. However with the difficulty of finding any type of employment ..., together with the fact that I have now lost all interest in an engineering course, even if an opportunity arose, I would prefer a job with less study and more practical aspects to it.

It seems certain, given the nature of some explanations, that a lower rate than the 45 percent would in fact continue. When people respond to questions about future intentions, their responses may be influenced as much by wishes and aspirations (even unrealistic ones) as by likely eventualities. Because there is a natural tendency for questionnaire or interview respondents to present themselves in as favourable a light as possible, cautious interpretation of the findings on future intentions is advisable.

Summary

The foregoing discussion convasses dropout reasons in four broad categories and looks at post-Intermediate Certificate dropout. Although responses from 97 respondents are not sufficient to indicate firm trends they can be taken as tentative indicators of concerns and of possible research issues.

The *course-related* responses suggested that course difficulty was a very important reason for dropout. This reason became especially pertinent when linked with correspondence study. Length of study was mentioned by some respondents; mode of study was also raised with some preference being expressed for full-time study (including block courses), over part-time study. A number of teaching and classroom issues were also mentioned by some people.

The low level of need for NZCE study and the low value attached to the qualification were perceived as important *job-related* reasons. Insufficient time off work to study, emerging as a strong 'main reason', attracted enough comment to warrant its consideration for future research. Lack of suitable employment also appeared as an area of concern.

In the course of development people change their minds, have second thoughts, or choose new directions, and some dropout reasons of this *commitment/interest* kind emerged in the qualitative comments people made. Other similar reasons were probably masked by the generality of the two main statements that people checked in this category. Because of its interest as a normal developmental phenomenon, future research might investigate this category of reason more explicitly and in greater depth.

Personal reasons for dropping out were varied. For some, it was a matter of choosing among priorities, for others the result of unavoidable personal commitments, for still others the result of emotional factors outside NZCE study. No particular pattern emerged - rather, confirmation of the range of personal events which typically prompt changes of direction.

There were no demonstrably different factors which distinguished those who dropped out after fulfilling requirements for an Intermediate Certificate from those who withdrew earlier.

Finally, 44 respondents said that they intended to complete NZCE studies one day. Of the reasons they gave for not studying at the present time, 30 percent were family-related and 20 percent, work-related. The remaining 50 percent covered a variety of explanations - most of them similar to, or the same as, the reasons for dropout already cited. Several of these explanations suggested that the indicated rate of 45 percent for future completion of studies could be unrealistically high.

10 Individual Stories Of Dropout

This chapter focusses on the individual, and endeavours to illustrate what the experience of NZCE study was like for some of the students who dropped out. Heavy reliance on head-counting and statistical analysis in research reports tends to obscure the individual, and so the inclusion of some individual stories in this report might help to redress the balance. Concentrating on the individual can also highlight some of the relevant issues in a more meaningful way.

The four cases that follow were chosen from the questionnaire sample because they illustrate some of the major findings and areas of interest in the research. The student's sex, study option, job, progress, difficulties, and reasons for withdrawal were all taken into account in the selection. But two notes of caution must be injected here. The stories are not case studies in the full sense because they are based solely on questionnaire responses. Also they represent only one perspective - the student's. A full study would need to take a broader perspective and include information from the employer and perhaps course tutors. Generalizing from a few individuals also needs to be done with extreme caution. All the approaches used for studying human experience have their limitations, but the four stories below may provide some insights to complement the information already presented.

Sue : Mechanical Fitter (Apprentice)

Sue reached the final year of New Zealand Certificate studies in mechanical engineering before dropping out. Her experience convinced her that in the particular government department where she worked as a mechanical fitter 'there was absolutely no incentive at all to take up NZCE studies ... other than personal satisfaction'.

Sue left secondary school in 1972 at the end of her first year in the sixth form where she had been studying English, French, mathematics, chemistry and geography. It was her interest in practical things, in engineering and technology, which steered her towards a career as a technician. She also wanted to improve her qualifications. NZCE study at the technical institute in the metropolitan area where she lived seemed a promising route for a school leaver without the entrance qualification required for university study.

In 1973 she enrolled as a full-time student for her first year of NZCE study in the mechanical option. On the basis of her subject passes and grades in School Certificate and Sixth Form Certificate she was granted four subject exemptions from the eight subjects of the first two stages. Sue's NZCE studies spanned six years from her enrolment and, after the first year, they were undertaken on a part-time, concurrent basis. For most of her part-time study she attended evening classes at the technical institute where she began. For one year her evening study was combined with correspondence tuition, and in 1975 and 1977 she studied solely through the Technical Correspondence Institute.

Technical drawing II and mechanical technology were the two subjects she remembered as especially difficult. Her lack of practical background at the time she was studying technical drawing made this a hard subject for her. She put her problems with mechanical technology down to the same reason, combined with a lack of application on her part. When questioned some four years after she dropped out, Sue expressed mainly negative attitudes towards part-time evening classes, her main mode of NZCE study. In particular, she found evening tuition tiring and hurried. Despite perceiving correspondence, her other form of part-time study, as more difficult and less friendly, she felt generally more positive about correspondence tuition : she described it as organized, interesting, useful and rewarding.

Job experience as well as study experience was fundamental in Sue's decision to give up her pursuit of the NZCE. From 1974 to 1978 she was apprenticed as a mechanical fitter with a large government department - one which has since recognized an increasing demand for NZCE-qualified mechanical engineering technicians in the 1980s. She was not happy in the job while studying. This was partly because she wasn't sure of career plans, but her unhappiness stemmed largely from the difficulties she perceived : in getting the required practical experience or work that was appropriate to her study, and in trying to mix on-the-job training with NZCE study. As one of the early female apprentices she had expected more than the usual pressures; they 'were naturally inherent in such a position'. What she had not anticipated were the barriers she experienced in her attempt to reach qualified technician status.

The employer's reluctance to provide day release for study was a prime example. As she put it:

> Promise of day-release for attending NZCE classes in early apprenticeship never materialised throughout entire apprenticeship.

In fact Sue was allowed to enrol in her final year on one day a week for day-release classes. She combined this with four hours night school. But her first and only spell of day release was aborted after a few weeks when word came from the department's head office in Wellington countermanding the approval. She was told that the two stage 5 subjects she had been doing on day release would have to be done by correspondence in her own time. This change meant she had to enrol late with the Technical Correspondence Institute, continuing the two subjects on that basis while studying the third subject in evening classes. She sat the three exams only to find that her report card registered 'Incomplete course work' against mechanical technology II. Her last correspondence assignment was not in on time but, according to Sue, the Technical Correspondence Institute did not inform her of her 'incomplete' status. She commented:

> After that year I really lost interest in the whole thing ... went along a couple of years and sat the exam without even attending a teaching institute - consequently I failed each time!

The reasons Sue cited for withdrawing from her NZCE studies illustrate well the combinations of factors which can lead to dropout. In her case there was an obvious trigger : *I missed out in a key exam (so I gave up)* was the main reason she nominated. Other concerns had been the nature and amount of NZCE study : she found it difficult and felt burdened by it. These feelings were probably exacerbated by the frustration she experienced in not having enough time off work to study. She also perceived that completing the course and obtaining the NZCE qualification were of doubtful relevance and use for her job. Her experience once she had completed her apprenticeship confirmed that NZCE study had not enhanced her job prospects, except temporarily. An early promise that advanced study would result in an automatic promotion to an engineering officer's job at the end of her apprenticeship did eventuate, but only for long enough to increase her frustration. For six months after her apprenticeship she worked as an *acting* engineering officer - 'until Wellington head office informed me I couldn't do this and had to stay a mechanical fitter'.

In 1979 she became a student in a one-year course for adults at a secondary teachers college. This change, followed by marriage and a shift to a rural location, completed her withdrawal from NZCE study.

Four years later Sue still had an eye on the NZCE. Living in a remote area and caring for two small children made it hard for her to study, but she intended to complete her NZCE studies one day. She expressed one hope for others: that apprenticeship day release for NZCE had improved by now in the Public Service.

Kevin : Electrician

Kevin had four bites at NZCE but he found it hard going. Since he dropped out in 1978 he has obviously thought a lot about the conditions that are important for successful NZCE study. His advice to young people contemplating the certificate course would be:

1. Find an employer who will back your study.
2. Make sure you have a good schooling in mathematics.
3. Go straight into NZCE study from school.
4. Do it by combining full- and part-time study rather than through correspondence.

As an early school leaver Kevin had little opportunity to follow the prescription he set later. His parents couldn't afford to keep him at school beyond his first year in the fifth form. He left secondary school in 1957, having obtained the old form of School Certificate. That is to say, he gained over 50 percent in three subjects and 40 percent in the fourth, exceeding the total of 200 marks necessary for a pass. His final year subjects at school were mathematics, physics, chemistry, English and geography.

Kevin accepted the best job going at the time in the urban area where he lived, an apprenticeship with a private firm of electrical contractors. He completed his apprenticeship and continued with the advanced trade exams for the electrical trade afterwards.

Still keen to improve his qualifications he enrolled in 1967 for NZCE (Electrical) study - ten years after leaving school. He was then married with a family. His need to continue earning while studying was therefore an overriding factor in his decision to take the technician career path. His previous exam results allowed him four subject exemptions, and with these credits he embarked on the certificate course with the Technical Correspondence Institute. His correspondence study, which included two breaks, covered four years : 1967-68, 1972 and 1978. During this time the employer gave him no support or assistance to attend the necessary block courses, and with long working hours he had little time to study. Not without some bitterness Kevin contrasted his misfortune with the situation he witnessed some years later: the employer backed his own son through the NZCE and then through a university degree.

Correspondence study suited Kevin's requirements in some respects. It was convenient and allowed him to study at his own pace; although it tended to be difficult and tiring, it was also interesting. Mathematics was the stumbling block. He felt at a disadvantage in this subject because it was so long since he left school. Coupled with this was the long delay experienced in getting help or answers for problems - 'usually only after next assignment commenced'.

Kevin was reluctant to generalize about his attitudes towards the job while he was studying. In fact it was hard for him to do so, partly because of the time lapse, but also because of the 'vast variations' in the scope and location of his work. There was tiredness and some frustration, he recalled, but as a job it was fairly unhurried, interesting, quite easy and useful.

Despite the lack of employer support, Kevin's prime reasons for withdrawing from NZCE studies were possibly more closely related to the course than the job. The course was hard work, especially doing all the study in his spare time; he felt overloaded with study and found the pass requirements fairly demanding. Maybe, Kevin added, he'd 'just got lazy'.

When he withdrew he had not got beyond the first two stages of the course. Block or sandwich courses, had he been able to afford them, would possibly have seen him finishing NZCE. But Kevin was very doubtful that he would ever complete it now. Besides, the certificate was no longer of any particular value to him as a qualification for employment. The only reason to persist would be the personal challenge, the same reason which led him to attempt NZCE in the first place - 'just the aim to do the best I could with qualifications ...'.

Mark : Engineering Technician

Mark had a smooth start to NZCE study : he obtained his Intermediate Certificate after one year of full-time study. Then he met some obstacles.

The subjects he took in his final year at school were a good base for engineering studies - mathematics, English, technical drawing, chemistry, physics and economic studies. By the end of his first year in the sixth form he had his School Certificate, Sixth Form Certificate and University Entrance and could have planned to go on to university. But Mark didn't think university would suit him and he also wanted to leave school, which he did in 1979. By taking a technician course he could satisfy his interest in engineering and practical things, improve his qualifications and earn while he studied. With these considerations in mind he enrolled, in 1980, to do the New Zealand Certificate in civil engineering at the community college in the South Island provincial town where he lived. His level of school qualifications gave five subject exemptions and made him eligible for a full-time three-in-one course.

Although he found the course fairly difficult and strict, rather than easy-going, his comments about being a full-time student were otherwise positive. None of the subjects proved to be especially difficult for him.

After his successful full-time year Mark was taken on as an engineering technician in a private firm of consulting engineers. He planned to continue his NZCE studies and applied for classes at the community college in 1982. But his application was rejected owing to lack of numbers. In 1983 he tried again only to be turned down for the same reason. Feeling he had no choice, he applied to the Technical Correspondence Institute - but reluctantly, as he didn't want to do correspondence. The end result was a wasted year in 1983, 'because I was too lazy and had a little difficulty with civil engineering practice'. From his questionnaire response, stating that he 'ceased study for NZCE in 1980', he clearly considered that his dropout dated from that time.

We have little information about Mark's job but he seems to have been well-disposed towards it while he was studying, or trying to study. Quite clearly it was correspondence study that put him off. There was also some conflict between study and his sporting or recreational commitments. He was somewhat ambivalent about whether he would ever complete the NZCE course. He could only finish it by correspondence but would rather not do it that way as that method of study did not really suit him. That is why at the time he was questioned he had 'virtually left it'.

Mark thought the best way to overcome the barrier he met would be to boost the numbers attending classes for NZCE in Civil : 'I feel it should be made compulsory, like a mechanic's apprenticeship, to attend classes.'

Colin : Mechanical Engineering Draughtsman

Colin spent six years studying for the NZCE, often leaving home at seven o'clock in the morning and not getting back until half past nine at night. In the end he became discouraged and gave up without even attempting the stage 5 subjects.

For most of his study years from 1974 to 1979 he worked as a mechanical engineering draughtsman for a private company which specialized in manufacturing heavy industrial equipment. His work involved all aspects of the business, ranging across simple design and calculation work, pricing, and liaison with customers over technical requirements and contractual matters. It was the contact with customers that gave him the greatest job satisfaction. The job was the best one going when Colin left school in 1973. This reason, and his desire to earn while studying, were his two most important considerations in setting out to become a technician. His wanting to leave school, his technological interest and his wish to become better qualified were other reasons, but secondary ones.

He began NZCE study in 1974, the year he started work as a draughtsman. With only a low-level school qualification - a few School Certificate subjects - he faced a prolonged period of part-time study to gain the final certificate. In the sixth form he had studied English, geography, mathematics and technical drawing and was granted one subject exemption for the mechanical option of the NZCE when he enrolled at the technical institute. The prospect for Colin was therefore five years study, at least, to complete the five stages of the course.

He attended the same technical institute in a metropolitan area throughout his years of study. In addition, he studied some subjects through the Technical Correspondence Institute for his last three years, from 1977 to 1979. Hence his study was all on a part-time basis : a combination of day-release classes, evening classes and correspondence. His attitude towards his main form of tuition, part-time day release, was negative in a few respects - he described it as tiring, boring and fairly hurried - but mostly he was positive about it. He felt more positive or neutral about correspondence study although he found it also fairly tiring.

Mechanics I proved difficult when he first attempted it. Colin put this down to his lack of knowledge about physics, even though he was studying physics concurrently with mechanics. He thought mechanics I should be a year 3 subject with physics I as a pre-requisite. Chemistry I he considered largely irrelevant : 'Over 75% is totally unrelated to engineering and to have any understanding of the subject was extremely time consuming.'

But the two subjects that caused him most trouble were mathematics III and electricity. He studied electricity by correspondence and made these comments:

> Although the assignments covered all topics, the subject is very prolific and difficult to swot at exam time. Also, the subject wasn't that aligned to my field.

Mathematics III seems to have been his Achilles heel, and the difficulty he encountered with this subject was closely linked with his dropout. He even tried doing mathematics III by correspondence but found it difficult when he met a problem and couldn't get immediate help. He only managed to get three-quarters of the way through the correspondence course. A change of job and a move away from the city to a town made it even more difficult to complete mathematics III. He explained that the fact he did not complete this subject was one reason why he withdrew from NZCE studies:

> ... Because I never completed maths III. I knew it was pointless to attempt the Year V subjects without it, as these subjects are more mathematical than mechanical. In [town] there is no Technical College who teach the subject. It is also difficult to get someone to give you regular tuition in the subject.

Colin gave a variety of other reasons for withdrawing in 1979. Interference with sporting/recreational commitments was the main reason. There were several course-related reasons: lack of subject exemptions, problems with correspondence study, the amount of work required to pass subjects, and the amount of time needed to complete the course, especially when subjects had to be repeated. He described the effect of missing subjects in these words:

> I also missed four subjects which I had to repeat and this seemed to discourage me a little, especially since I was only doing it on a part-time basis. This just tacks a bit more time onto the total time the course takes to complete.

Fitting NZCE study in alongside a full-time job was 'very difficult' despite markedly positive attitudes towards the job while studying. Still the study helped, Colin thought, to get him 'in the door' of the large company where he was working at the time he answered our questions. But the change of job helped to finalize his decision to opt out of NZCE studies, because the evidence seemed to be that the final qualification was neither necessary nor highly valued by his new employer.

> ... and although the company encourage staff to study for NZCE there is no need for the qualification in a draughting position. As well, any promotions in the engineering or production areas seem to be open only to those who possess B.E. degrees. This discourages many in our office from continuing their NZCE studies. This seems to be fairly common with Government Departments ... and larger public companies.

Colin had no plans to complete his NZCE studies in the future.

11 Researching Dropout In Technician Education

Here you might expect to find a section headed 'Reducing Dropout' and perhaps a set of recommendations aimed at doing just that. For several reasons we thought it would be inappropriate to conclude the research report in this typical fashion. One reason is that the study did not provide precise information on the extent or rate of dropout from NZCE studies. Nor was it designed to do so. Recommendations concerning the reduction of dropout would be better based on a clearer definition of the size of the problem that would also allow comparison with dropout in other sectors of tertiary education. Other reasons relate to the exploratory nature of the research. The study was limited intentionally, but also in ways that were not anticipated. For example, by design the only people consulted among the groups likely to have information or views on the reasons for dropout were former students. But the findings on the perceptions of the former students rest on a less representative and considerably smaller sample of dropouts than planned. While a study of this kind cannot be expected to give sure answers it can define some of the important issues.

The NZCE Dropout Study has identified some critical issues which should be considered in attempts to reduce dropout and in planning a more comprehensive study of the topic. The three issues which have been selected for brief discussion here are:

1. Responsibility for student progress.
2. Employment as a complementary context for study.
3. Organization of courses.

The findings on which the discussion of issues is based are given in the summaries at the end of each chapter. The chapter concludes with some thoughts on a suitable strategy for researching dropout in technician education.

Responsibility for student progress

The evidence is that many students who drop out find the NZCE course too difficult. Many of them are well-qualified school leavers who could reasonably be expected to build on their secondary schooling and progress satisfactorily towards the final qualification. Instead they withdraw, sometimes after quite a struggle and often without even a minimal level of achievement for their personal satisfaction.

Concern for these students personally, especially if they are making their first moves towards adult working life, let alone the unmet demand for well-qualified technician engineers, suggests the need for a closer look at the issue of responsibility for student progress and achievement. Apart from the students themselves, there are three groups or agencies which could be expected to assume a share of this responsibility : the national body which sets the standards and prescribes the courses for the NZCE, the teaching institutions and the employers.

The concern of the national body over lack of student progress and its acceptance of responsibility are clearly documented. In its third annual report the Technician Certification Authority (1963) noted the situation and the dilemma:

> The Authority has long been aware that it has registered many students who do not make the progress they presumably hoped for. This is not an unusual situation; but it is one that inevitably causes concern. If a reasonable percentage of students - whatever that may be - does not complete the course we may be accused of setting too high a standard. If the study road presents no intellectual obstacles then the final product may well be suspect. (p.12)

In an attempt to encourage students to complete the first two years and 'push on with third year studies' the Authority introduced a Preliminary Certificate in 1964 for completion or near-completion of the first two stages. The certificate gave no automatic right of entry to the third year as the student may not have taken the subjects prescribed for the third year course, but it was hoped that recognition of the new certificate would engender more interest 'in shaping a pupil's course towards a particular technician goal while he is still at school'. However, by 1969 the incentive of the Preliminary Certificate had been abandoned.

What is significant from this account is not the fate of the carrot that was produced to entice the student but the evidence that the Authority was concerned about setting realistic standards and promoting continuity of learning. The results of the present research project suggest that these two areas might be profitable ones for further investigation if we want to know why students find the NZCE course difficult. It may be that some subjects in the AAVA courses, for example, mathematics and mechanics, are too advanced as they are presently prescribed and taught, even for people with a good level of entry qualification. This research project tells us that students think these subjects are difficult, but it does not provide any factual information on achievement of course work or on examination pass rates for the subjects in question. There may be curricular discontinuities associated with school learning and certificate study other than level of difficulty. For example, school mathematics may differ from NZCE mathematics in pace and style of presentation, range of content, and general orientation (e.g. theoretical versus applied). It is important to know more about the kinds of learning difficulties NZCE students have and whether they result from discontinuities of this sort. Analysis of prescriptions gives some relevant information, and assessments of the readability of assignments can be revealing (see e.g. Wagner, 1980). But these need to be supplemented by analysis of the difficulties actually encountered by students. The necessary information could be obtained from case studies of students' experiences in making the transition from school to technical institute and from classroom observations in both settings. Callaghan (1981) has already argued for more research into Technical Correspondence Institute assignments and courses to find out, in particular, 'how distance education students learn via a difficult medium'.

The responsibility of the teaching institutions, and the resources they have, to help students overcome their difficulties is another important area for investigation. Responses from the dropouts indicate a clear need for personal tutorial help. This need applies particularly to students studying by correspondence. Tutorial systems in other tertiary institutions such as teachers colleges and universities are well established, but the problems of finding and funding appropriate forms of support within technical institutes and in the field for such large numbers of students studying part-time, or at a distance, are of a different order. Yet the two-way benefits of support schemes should not be overlooked, as Callaghan (1981) noted:

> Liaison officers in remoter areas together with expert volunteers for support groups would be invaluable, not only to assist students, but to obtain feedback for TCI.

Employers' responsibility for the progress and achievement of their trainees in NZCE studies is a less clear-cut issue. Some might argue that the employer's responsibility stops at providing an appropriate work context and time off work for study. The counter argument is that the day or block release system gives employers the right, at least, to be kept informed about the attendance and progress of their trainees. Further, such feedback is seen not as a check on the trainee's performance but as a way of stimulating the involvement of the employer in the education of his or her employees. It would be useful to know if employers are so informed, whether they find existing arrangements for reporting progress satisfactory, and what use the information is, or would be, to them in helping trainees who are having difficulties. Likewise the views of institute staff on the involvement of employers in monitoring student progress could be sought. If employers accept a more active responsibility in this respect do they also need more information on the content of NZCE study options and course requirements?

Employment as a complementary context for study

The philosophy of technician education, as expressed in the requirements for the New Zealand Certificate, centres on the view that 'suitable work experience provides the vital context for effective study of vocational subjects and for the development of appropriate attitudes and understanding' (Imrie, 1984, p.4). The rationale is that work provides a setting in which the student can directly relate the subjects being studied to the work he or she is doing. Hence the student gets to understand specific content and terminology better, to see how theoretical knowledge and practical skills complement each other, and also to learn from other experienced people.

In recent years the work experience requirements for students undertaking the advanced stages of certificate study have been made more flexible : for example, the students concerned in this research had to have suitable *employment* whereas now the requirement is for prior or concurrent suitable *work experience*. As well, more attention has been given to what is meant by suitable work experience. The *AAVA Handbook* and the *Work Experience Record Book*, first issued to students by AAVA in 1984, define it as 'work experience directly related to a student's chosen Certificate of Study' and set down three conditions that must be met before work experience is deemed 'suitable'. The first condition specifies employment or placement over a normal working year, averaging not less than 20 hours a week. The other conditions are that:

1. The organisation within which the student obtains suitable work experience requires the skills and knowledge appropriate to the Certificate course in question.
2. The work experience allows the student reasonable access to information, equipment and processes that are related to his or her current study, and permits the student to consult with experienced staff in ways that will assist the student in relating syllabus concepts to their practical application.

Clearly, the emphasis is still on work as a complementary context for study. That is to say, the student is not expected to learn anything from work experience in the sense of specific objectives - work experience provides a context only (Imrie, 1985). The situation is still as Offenberger (1979) explained:

> There exists no prescribed list of skills or activities which the technician has to master before his employment is regarded as a suitable complement to his formal studies. Industry is too heterogeneous for this to be practically possible.

But at the time of writing AAVA was engaged in preparing further guidelines, if not prescriptions, on the context of suitable work experience for vocational study.

Now one of the important things the dropouts in the survey seem to be saying is that the link between their jobs and their study is not being achieved effectively. Some are not getting work experience in appropriate areas for their study, most find their jobs are little use to their studies, and further, that what they learn in NZCE study is not needed on the job. Similar findings were reported from a recent evaluation of technician education programmes in the United Kingdom, for example:

> Most students in the case-study sample were of the opinion that, so far as job performance is concerned, college studies are almost totally unnecessary. When asked to quantify the contribution of TEC programmes to job learning nearly all gave a figure between five and fifteen percent. (Moor, Dean and Andrews, 1983, p.45.)

Of course the relevance of studies to the job is only one consideration; a student may continue studying for other reasons, such as wanting to enhance job prospects. But it is reasonable to ask : if the students in the present study were fully engaged with what they were learning through their study and its application in practice would they have been as inclined to drop out?

The search for answers to the crucial question of how to help technician students transfer their learning from one situation to another, in other words connect their knowledge with their experience, entails a close look at three areas. First, more needs to be known about the nature of students' workplace experience. Observations and case studies involving employers and students would help to identify the common elements of varied work experience as well as the elements that are most important to complementing study within each option. This information is an essential requirement in attempts to involve employers systematically in designing desirable work experience. Second, the formal and informal liaison between technical institute or community college and industry requires study. Do employers want, or need, opportunities to become familiar with the classroom or laboratory studies their trainees undertake? Do tutors visit workplaces to improve their understanding of technicians' jobs? Do the assignments that are set for students provide for communication between them and their experienced work colleagues, or encourage a joint approach to solving problems? Third, there is a need to find out what constitutes effective on-the-job support for students. How will it apply in large government organizations such as the Post Office, the Broadcasting Corporation, Electricity Division or the Railways Corporation, compared with large private companies or the smaller private companies which make up a big part of the mechanical engineering industry?

Organization of courses

The main issue concerning the organization of NZCE courses relates to modes of attendance or study. Day release, evening classes and correspondence study are the modes which allow technician engineering students to combine their academic study with work, and combinations of these primary modes are also common. The research did not tell us if dropout was more closely associated with one mode of study than with another, but it showed that dissatisfaction with correspondence study and problems in getting time off work were two major reasons cited by students for dropout.

Students' experiences in correspondence study need to be investigated in more detail in order to identify which aspects are displeasing and likely to encourage withdrawal. Such an investigation would provide evidence also on the extent to which correspondence tuition provides an academically supportive environment for NZCE study, and how it might be improved. The reasons students enrol with the Technical Correspondence Institute need to be known as well. How many students undertake correspondence study not for reasons of isolated location or unavailability of courses but because they lack support from employers for day release?

The acceptability of day release to employers is obviously an important topic to follow up. Perhaps the employer is resistant to day release because of the loss of labour involved, or he grants it reluctantly. On the other hand he may positively encourage employment release, either on a day or block basis, in order to facilitate completion of studies in the minimum time, or because he perceives certain industrial benefits from the study. Such attitudes are bound to affect students' own attitudes towards their studies, making them more or less inclined to drop out. It is therefore useful to know what considerations determine employers' attitudes and policies regarding release from work for study, and whether these considerations vary according to, say, the size of the firm. Does the stage the student has reached in the job, in the apprenticeship or in NZCE study make any difference to employers' attitudes? It may be that there is a case for financial incentives to employers to encourage day or block release. How acceptable are the actual arrangements for day release, for example, number of days and total hours involved each week?

By recruiting trainees who have completed the three-in-one full-time course, employers adopt a pattern that reduces the length of concurrent study time for completion of the NZCE to two years. About a fifth of the former students who were questioned had studied full-time in their first year, but the research did not tell us how many were successful or what their rate of dropout was compared with others not engaged in that mode of study. Because the full-time pattern has the potential advantage of supplying qualified staff in less time it seems essential to know more about the experiences and perceptions of employers and students associated with it. In dropout terms, the transitional period between completing full-time study and moving into a job with concurrent study may be a specially vulnerable time. Are the products of the three-in-one courses acceptable to employers? Does lack of industrial or practical experience prove a disincentive for the students themselves?

A strategy for researching dropout

In devising a strategy for future dropout research the *use* of this form of research needs close consideration. In broad terms dropout research does two things. It identifies those who are so discouraged or dissatisfied with aspects of the course, or the conditions under which they are studying, that they withdraw; and, properly designed, it also provides evidence on how many people in a given situation take this action. One could say it focusses on a group of people who make their evaluations visible - with their feet - and in this sense it fits loosely into the context of evaluation research. Indeed investigations of reasons for dropout often provide evaluative information that may be used to improve courses and conditions of study, or to change policy, two recognized functions of evaluation research.

An evaluation perspective can increase the value of dropout research by emphasizing the need for useful information. Developmental research gives another valuable perspective. This kind of research, concerned as it is with qualitative changes occurring over time, pays attention to people in context and how the relationships between people and their contexts affect the characteristics under study. For example, this method of research is appropriate for the study of shifts of interest, commitment or motivation in students as they proceed through their New Zealand Certificate course. In trying to explain these shifts, however, the developmental researcher is probably more likely to want to examine the context of the student's job as well as the context of his or her study.

Drawing on both perspectives, it is possible to establish a number of general guidelines to make sure that dropout research in technician education builds constructively on the exploratory study reported here. These guidelines are as follows:

1. *The people, or groups, most likely to use the research should be involved, or consulted, in planning it.* Their participation and understanding of their particular function in technician education are necessary to ensure that the research extends the present knowledge base and moves towards gathering the kind of information which they can each act on if dropout is to be reduced. Obvious groups for inclusion are AAVA, the Department of Education, teachers in technical institutes, student technicians, employers, employers' organizations, and training bodies. Deciding the most appropriate focus for the research will inevitably entail working through some conflicts of needs or interests, but resolving such conflicts is an essential part of this kind of collaborative research planning.
2. *Dropout should be studied in a broad context whenever possible.* Dropout studies tend to result in more valid and useful information if they are set in a wider study of student progress and performance, and not confined to just the students who have dropped out. Calculations of dropout rates depend on contextual information about total student numbers, and even then can only be made reliably

in technician education if some account is taken of other factors, such as variations in course length due to differences in the point of entry for students or their status as full- or part-time. The other reason for choosing a broad context is more subtle. It follows from the recognition that dropout students represent only one end of a continuum of students, and that there is likely to be a considerable overlap between the reasons attributed by students for dropout and the general dissatisfaction expressed by other non-dropout students. The crucial task for dropout research is trying to determine in what respects the perceptions and experiences of dropouts are uniquely theirs, what differentiates them from non-dropouts. This task can only be accomplished by taking the broad approach. But such an approach has the potential to yield a double benefit : it may also reveal what it is that makes a student persist rather than drop out.

3. *The research should acknowledge what has been well described as the umbilical nature of the relationship between college or technical institute and industry.* AAVA, in developing NZCE courses and setting standards for them, takes account of their acceptability to employers of technicians. This practice of consultation recognizes not only job destinations for qualified people but also the essential characteristic of technician education, prior or concurrent work experience while qualifying. Likewise the researcher seeking meaningful interpretations of evidence about dropout will ensure that the evidence is not gathered in isolation from the student's work experience. As the issues and questions identified in the earlier section indicate, employers' views on the content of AAVA courses and associated work experience, on liaison with teaching institutions, and on the organization of courses may all have an important bearing on dropout, and therefore need to be investigated.

4. *The research should adopt a follow-up longitudinal design rather than a one-shot retrospective stance.* Guidelines 2 and 4 are closely related as together they prescribe desirable conditions for studying dropout. Compared with sampling students at one time well after they have left a course, when hazy memories may produce inaccurate data, following students over a longer term has advantages. It permits repeated studies or assessments of behaviour,

making it possible, for example, to chart patterns of progress and changes of attitude. Different levels or methods of approach can be combined, such as a survey and more intensive case studies. In this way an explanatory context can be built up along with the statistical evidence of student performance and dropout. The longitudinal design usually involves the selection of a large sample which in turn makes provision for in-depth studies of particular groups forming sub-samples, for example, students studying by correspondence. The time period selected for a study of dropout would be based on evidence about the length of time actually taken to complete the qualification, which, in the case of NZCE, averages four years according to a recent analysis made by the Engineering Industry Training Board (1985). A longitudinal design applied to the study of dropout from, say. New Zealand Certificate in Commerce studies might include: (a) A cohort comprising all the Commerce certificate registrations for one year (1,958 students registered for NZCC in 1983); and (b) A sub-sample of the cohort students, their employers and teachers, selected from a sample of teaching institutions associated with the cohort.

5. *The research should be methodologically sound.* For example, a sub-sample selected as in (b) above should reflect a range of industrial, educational and geographical settings. Emphasis should be placed on developing pilot studies where necessary to establish specific variables for study, or to test the suitability of proposed questions; selecting appropriate techniques to obtain valid information; and using the well-established procedures that enhance co-operation and minimize the problem of missing data.
6. *The cost of this kind of long-term research should be recognized in a realistic budget with provision for continuity of full-time staffing.* The recent evaluation of the new technician education programmes in England and Wales employed a research team of three to investigate three sectors (Mechanical and Production Engineering, Building Studies, and Science) over five years from 1979 to 1983. The project was based on a separate six-months feasibility study undertaken earlier. The budget for the main study, when it was approved by the Department of Education and Science in 1978, was

£160,000. It is true that the educational research efforts in the two countries are not directly comparable, but long-term research on a national basis is labour-intensive and costly in New Zealand also. One possible solution may be to seek closer participation from employers in planning and carrying out research, along with financial support from the larger industrial companies at least.

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Appendix 1

Jobs held while studying

Following is a breakdown of the jobs held by students in the questionnaire sample. Where possible the jobs were grouped according to the four areas of engineering under scrutiny.

Civil

It was not always clear whether jobs could be classified Civil or not. Those listed below were the only obvious ones. Others in categories such as draughting may also have been Civil.

Roading cadet : County Council (1)
Soil testing technicians : regional authority (1)
   Ministry of Works and Development (1)

Mechanical

Mechanical engineer : private firm (5)
Mechanical engineering cadets : Ministry of Energy (1), local bodies (2)
Technicians : Post Office (1); Ministry of Works and Development (1); Air New Zealand (1)
Fitters and turners : Private firms (4); Ministry of Energy (1); Navy (1)
Tool maker : Private firm (1)
Engineering tutor in community college (1)

Electrical

Electrical technicians : local bodies (2); hospital (1);
Ministry of Energy (1); electrical/ electronics firms (2); Navy (1)
Electrical/electronics technicians : private firms (3); university (1)
Electrical apprentice : municipal electricity divisions (1); Railways (1)
Shift operator : Ministry of Energy (1)
Contracting electrician : (1)
Transmission line construction : Ministry of Energy (1)

Telecommunications

Telecommunications/telephone technicians and cadets : Post Office (8); power supply authority (1); Ministry of Energy (1)
Lineman : Post Office (2)
Radio/television technicians : Private firms (3); Broadcasting Corporation (3)
Radio technician trainee : Post Office (1); Broadcasting Corporation (1)
Radio inspector : Post Office (1)

Draughting (not clearly in any of the above options)

Draughting officers : Ministry of Energy (1); Ministry of Works and Development (1); private engineering firms (3); oil company (1)
Draughting cadets : Ministry of Works and Development (3); Railways (1); local body (1); private engineering firms (2)

General

Labouring : private firm (1)
Storeman : private firm (2)
Servicing/maintenance : private firm (3)
Quality control technician : private firm (1)
Industrial instrumentation : private firm (2)
Defence : Army officer (1); Air Force armaments fitter (1)
Not able to be categorized : (5)

Appendix 2

NEW ZEALAND
COUNCIL FOR
EDUCATIONAL
RESEARCH.

SURVEY OF STUDENTS TAKING THE NEW ZEALAND CERTIFICATE IN ENGINEERING

In this survey we are asking some former New Zealand Certificate in Engineering students from all over the country about their past and present work and study plans. Some of the sample started their New Zealand Certificate in Engineering (NZCE) studies as far back as 1973, and others have only just registered. Your answers are important because they will help to provide a comprehensive picture of the study programmes of NZCE students and supply us with information to suggest improvements to future courses.

EVERY ANSWER IS CONFIDENTIAL. Your name is never used for anything except to post out a letter to you.

Please read the questionnaire carefully and fill in the boxes or blank spaces provided. Answer as many questions as you can and return this questionnaire in the stamped addressed envelop as soon as possible.

Thank you very much. We appreciate your help.

NOW PLEASE READ THE NEXT PAGE WHICH CONTAINS INFORMATION ON HOW TO COMPLETE THE QUESTIONNAIRE.

Directions for Completing this Questionnaire

1. Most questions can be answered by entering the appropriate numerals in the boxes on the right-hand side of the page. You should enter only ONE numeral in any one box; if there are two boxes, enter one digit in each box;

   (e.g.) | 0 | 6 | or | 6 | 2 |

   (Note: The numerals under the boxes relate to computer processing and do not correspond to question numbers.)

2. Do not write anything in boxes marked with double lines.

   (e.g.) ☐ ☐☐

3. Other questions can be answered by writing in the space provided.

4. Space has also been provided at the end of the questionnaire for any further comments you may care to make.

5. If you have any questions about the survey or the questionnaire please contact

MR GRAHAM WAGNER
NEW ZEALAND COUNCIL FOR EDUCATIONAL RESEARCH
P.O. BOX 3237
WELLINGTON (PHONE: 847 939)

SECTION 1: BACKGROUND AND QUALIFICATIONS

1. Have you completed your NZCE in one of these options? ---------- ☐

Mechanical Engineering
Telecommunications
Electrical
Civil Engineering

1 = yes 2 = no

> If your answer to Question 1 was yes then please return this questionnaire without further comment. Otherwise, go on to Question 2.

2. In what year did you finish full-time study at a secondary school? -- ☐☐

(e.g. 1971 = 7 1)

3. In which class were you when you left secondary school? -------- ☐

1 = third form
2 = fourth form
3 = 1st year fifth form
4 = 2nd year fifth form
5 = 3rd year fifth form
6 = 1st year sixth form
7 = 2nd year sixth form
8 = seventh form
9 = other (please specify) ______________________________

4. What subjects did you take in your last year of secondary schooling? ☐☐

Subjects ____________________ ____________________
____________________ ____________________
____________________ ____________________
____________________ ____________________

5. Please indicate whether you had any of the following qualifications upon leaving school.

1 = yes 2 = no

School Certificate in 1 subject -------------------------------- ☐
School Certificate in 2 or 3 subjects ------------------------- ☐
School Certificate in more than 3 subjects -------------------- ☐
Endorsed School Certificate ------------------------------------ ☐
6th Form Certificate --- ☐
University Entrance -- ☐
Higher School Certificate --------------------------------------- ☐
Bursary or Scholarship --- ☐
Other: Please specify -- ☐

SECTION 2: NZCE STUDY

6. In what year did you first enrol for NZCE study? ---------------- ☐☐

   (e.g. 1973 = 7 3)

7. In starting your NZCE studies did you come directly from -------- ☐

   1 = school

   2 = trade/work

   3 = university

   4 = other: please specify: ______________________

8. If you attended any New Zealand (or overseas) university prior to commencing NZCE study how many credits did you get towards your NZCE? -- ☐☐☐

   (Note: 1 paper = 12 credits)

9. Did you complete a Technician's Certificate before starting your NZCE programme? -- ☐

   1 = yes 2 = no

   If yes, please indicate which course ☐☐

   ____

10. How many subject exemptions did you have when you began your NZCE? -- ☐☐

    (e.g. 6 exemptions = 0 6)

    If you cannot remember write '99' in the box alongside.

11. What size city or town did you live in which you were studying for your NZCE? -- ☐

    1 = Auckland, Hamilton, Palmerston North, Wellington, Christchurch and Dunedin metropolitan areas.

    2 = Other urban (more than 20,000 people).

    3 = Large town (10,000 - 19,999)

    4 = Medium town (5,000 - 9,999)

    5 = Small town (1,000 - 4,999)

    6 = Rural (fewer than 1,000)

12. Please indicate at which institution(s) you did your NZCE study and during which years? e.g. Petone Technical Institute - 1973-74 and the Technical Correspondence Institute - 1974-76).

Institution(s)	Year(s)

13. Were you a full-time student during your first year of NZCE study? ☐

1 = yes 2 = no

If yes, how many years and months in total did you spend in full-time NZCE study?

year(s) (e.g. 4 years = 0 4) ☐☐

month(s) (e.g.11 months = 1 1) ☐☐

14. Please indicate the method(s) by which you received tuition for your NZCE.

1 = yes 2 = no

As a secondary school pupil in a school approved for the purpose of NZCE study ☐

As a full-time student in a technical institute, community college, or senior technical division of a secondary school ☐

Part-time day release classes ☐

Part-time evening classes ☐

Correspondence ☐

Short block course (up to 4 weeks in one year) ☐

Long block course (between 9 and 12 weeks in one year) ☐

Accelerated long block course (two long block courses in the same year) ☐

Sandwich course (alternate weeks full-time at a technical institute, etc.) ☐

Other: Please specify ______ ☐

15. What NZCE option were you studying (in) when you withdrew? -------- ☐

1 = telecommunications
2 = civil
3 = mechanical
4 = electrical

16. In which year did you cease study for NZCE? -------------------- ☐☐

(e.g. 1971 = 7 1)

17. What was the highest stage you reached before withdrawing from your NZCE studies? -- ☐

1 = Stages I & II
2 = Stage III
3 = Stage IV
4 = Stage V

18. Did you change options at any time? (e.g. from Aeronautics to Civil or from Electrical to Telecommunications) --------------- ☐

1 = yes 2 = no

If yes, please explain why ☐☐

19. Did any subject or course prove to be especially difficult? ----- ☐

1 = yes 2 = no

If yes, please indicate which subject or course, and why it was difficult.

Subject/Course ☐☐

Reason ☐☐

20. Did you consider any subject in the NZCE syllabus to be irrelevant? ☐

1 = yes 2 = no

If yes, please indicate the subject and state why it was irrelevant for you.

Subject ☐☐

Reason ☐☐

21. Which do you consider the main reason(s) for withdrawing from your NZCE studies?

1 = yes 2 = no

I changed to a job where NZCE study was not necessary ☐
I married ☐
I shifted to another town ☐
My sporting/recreational commitments interfered ☐
I didn't have enough subject exemptions when I started study ☐
I took on too much study and was overloaded ☐
I transfered to a university engineering course ☐
I decided NZCE study wasn't for me ☐
I didn't know what I wanted to do at the time I started NZCE study and lost interest ☐
I didn't find NZCE study easy. It was too difficult ☐
I didn't get enough time off work to study ☐
I missed out in a key exam (so I gave up) ☐
The NZCE qualification was no use to me in my job ☐
Studying by correspondence did not suit me ☐
I didn't get on with one/some of my tutor(s) while studying NZCE ☐
I didn't need to complete the whole NZCE course for my job ☐
Other reason: Please specify: ☐

☐

Now go back and pick the one reason that stood out above all others and mark the box thus X.

(e.g. ☒)

22. Did you withdraw from NZCE study after completing an Intermediate Certificate? ------------------------------------ ☐

1 = yes 2 = no

If yes, please indicate the main reason for stopping your study at this stage ☐☐

____

____

____

____

23. Do you intend to complete your NZCE studies one day? ----------- ☐

1 = yes 2 = no

If yes, please indicate the main reason for preventing you studying at present ☐☐

____

____

____

____

SECTION 3: YOUR JOB AND NZCE STUDY

IF YOU WERE STUDYING WHILE WORKING, ANSWER Q'S 24 & 25 OTHERWISE GO TO Q26.

24. Please describe the type of job you had while studying for your NZCE. (e.g. telecommunications cadet in the NZ Post Office) ☐☐

____

____

____

25. Which of the following was your employer? ---------------------- ☐

1 = Government Dept (e.g. Post Office, Defence, Police)

2 = Private Firm

3 = Other (please specify) ______________________

If '1', please name the department ☐☐

____

26. How important were the following reasons in determining your choice of career as a technician? ☐

1 = very important

2 = quite important

3 = not very important

4 = not at all important

5 = not applicable

Reasons

Practical things interested me ☐

It was the best job offering at the time ☐

I wanted to improve my qualifications ☐

I wanted to earn while studying ☐

I could not get to university ☐

I was encouraged by my employer ☐

Engineering and technology interested me ☐

I was advised by a careers master or guidance officer ☐

I did not think the university would suit me ☐

Some of my friends were technicians ☐

I wanted to leave school ☐

I preferred it to the work I was doing ☐

Other important reasons: Please specify ☐

____

____

____

SECTION 4: ATTITUDES TO STUDY AND WORK

Instructions for Completing this Section.

Please read this carefully

In this section we want to know how you feel about certain things. You will see that there are pairs of words which are opposite to each other in meaning. Between each pair of words are seven numbers. We want you to circle ONE of the numbers between each pair of words to show how strongly you feel one way or the other.

Here is an example: If we wanted to know how you felt about T.V. programmes, we could do it this way:

I think T.V. programmes in general are:

Good	*1*	*2*	[✓ *3*]	*4*	*5*	*6*	*7*	*Bad*
	Very good	*Quite good*	*Fairly good*	*Unsure*	*Fairly bad*	*Quite bad*	*Very bad*	

This would mean that you thought T.V. programmes were "fairly good".

Now in what follows look at each pair of words and circle ONE number in each row to show how strongly you feel one way or the other. When you have completed one question go on to the next. Complete each line (there are 10) in each separate question.

27. Select the main method of tuition for your NZCE from the following list and write it in the space below headed "Main Method of Tuition" then complete the question as described above.

Main method of tuition:

As a secondary school pupil

As a full-time student at a technical institute (etc.)

As a part-time day-release student

As a correspondence student (TCI)

Part-time evening classes

Long block course (9 or 12 weeks)

Short block course (up to 4 weeks)

Accelerated long block course (2 long block courses in the same year)

Sandwich course (alternate weeks full-time at a technical institute etc.)

Main method of tuition = ______________________________ was

Boring	1	2	3	4	5	6	7	Interesting	☐
Easy	1	2	3	4	5	6	7	Difficult	☐
Useful	1	2	3	4	5	6	7	Useless	☐
Tiring	1	2	3	4	5	6	7	Not tiring	☐
Friendly	1	2	3	4	5	6	7	Unfriendly	☐
Frustrating	1	2	3	4	5	6	7	Rewarding	☐
Pleasant	1	2	3	4	5	6	7	Unpleasant	☐
Strict	1	2	3	4	5	6	7	Easy-going	☐
Organised	1	2	3	4	5	6	7	Not organised	☐
Hurried	1	2	3	4	5	6	7	Unhurried	☐

28. If you studied through the Technical Correspondence School but did not mark it as your main method of tuition in Q28 complete this question.

My Correspondence Tuition (by Technical Correspondence Institute assignments) was:

Boring	1	2	3	4	5	6	7	Interesting	☐
Easy	1	2	3	4	5	6	7	Difficult	☐
Useful	1	2	3	4	5	6	7	Useless	☐
Tiring	1	2	3	4	5	6	7	Not tiring	☐
Friendly	1	2	3	4	5	6	7	Unfriendly	☐
Frustrating	1	2	3	4	5	6	7	Rewarding	☐
Pleasant	1	2	3	4	5	6	7	Unpleasant	☐
Strict	1	2	3	4	5	6	7	Easy-going	☐
Organised	1	2	3	4	5	6	7	Not organised	☐
Hurried	1	2	3	4	5	6	7	Unhurried	☐

29. If you were employed while studying for your NZCE then please complete this question.

My job while studying was:

Boring	1	2	3	4	5	6	7	Interesting	☐
Easy	1	2	3	4	5	6	7	Difficult	☐
Useful	1	2	3	4	5	6	7	Useless	☐
Tiring	1	2	3	4	5	6	7	Not tiring	☐
Friendly	1	2	3	4	5	6	7	Unfriendly	☐
Frustrating	1	2	3	4	5	6	7	Rewarding	☐
Pleasant	1	2	3	4	5	6	7	Unpleasant	☐
Strict	1	2	3	4	5	6	7	Easy-going	☐
Organised	1	2	3	4	5	6	7	Not organised	☐
Hurried	1	2	3	4	5	6	7	Unhurried	☐

30. Were you reasonably happy in your employment while studying for an NZCE? -- ☐

1 = yes 2 = no

If 'yes', go on to Q33. If 'no', go on to next question.

31. Please indicate which of the following were reasons for being unhappy with your employment while doing NZCE study.

1 = yes 2 = no

I couldn't see good promotion prospects .... ☐

I was in the wrong type of job .... ☐

I wasn't given work appropriate to my future qualifications or NZCE study .... ☐

I didn't know what I really wanted to do (career) .... ☐

My employer didn't "treat me well" (personal) .... ☐

I was required to study against my will (as part of the job) .... ☐

I had difficulty getting the required practical experience ...... ☐

On-the-job training and NZCE study didn't mix .... ☐

There was a "personality clash" at work .... ☐

Other reason(s): Please state: ☐

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32. Did unhappiness with your employment affect your NZCE studies? .. ☐

1 = yes 2 = no

If yes, please state in what way: ☐

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33. Are there any general comments you would like to make about your NZCE study which will aid us in understanding why some students withdraw from their NZCE studies. If so, please write in the space below. ☐☐

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Thank you for your time.

(PLEASE RETURN AS SOON AS
POSSIBLE IN THE ENVELOPE
PROVIDED.)